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PATENT COOPERATION TREATY

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From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF RECEIPT OF RECORD COPY

(PCT Rule 24.2(a))

To:

RECEIVED
BAKER & BOTTS, L.L.P.

TANG, Henry
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
ÉTATS-UNIS D'AMÉRIQUE

98 DEC -10 PM 10: 59

TO

[Handwritten signature]

Date of mailing (day/month/year) 10 November 1998 (10.11.98)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 31978-PCT	International application No. PCT/US98/20397

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK (for all designated
States except US)

BENES, Martin et al (for US)

International filing date	:	30 September 1998 (30.09.98)
Priority date(s) claimed	:	15 September 1998 (15.09.98)
Date of receipt of the record copy by the International Bureau	:	09 November 1998 (09.11.98)
List of designated Offices	:	

National :CA,JP,MX,US

ATTENTION

The applicant should carefully check the data appearing in this Notification. In case of any discrepancy between these data and the indications in the international application, the applicant should immediately inform the International Bureau.

In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

- ☒ time limits for entry into the national phase
- ☒ confirmation of precautionary designations
- ☒ requirements regarding priority documents

A copy of this Notification is being sent to the receiving Office and to the International Searching Authority.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer: G. Bähr <i>[Signature]</i>
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

Form PCT/IB/301 (July 1998)

002328876

COPY TO

[Handwritten signature] 12/11

11.10
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From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF RECEIPT OF
RECORD COPY

(PCT Rule 24.2(a))

To:

RECEIVED
BAKER & BOTTS, L.L.P.TANG, Henry
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
ÉTATS-UNIS D'AMÉRIQUE

98 DEC -10 PM 10: 59

TC

Date of mailing (day/month/year) 10 November 1998 (10.11.98)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 31978-PCT	International application No. PCT/US98/20397

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THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK (for all designated
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List of designated Offices	:	

National :CA,JP,MX,US

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- ☒ requirements regarding priority documents

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The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer: G. Bähr
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

Form PCT/IB/301 (July 1998)

002328876

COPY TO

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PATENT COOPERATION TREATY

31978
PCT

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF RECEIPT OF RECORD COPY

(PCT Rule 24.2(a))

To:

TANG, Henry
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
ÉTATS-UNIS D'AMÉRIQUE

RECEIVED
BAKER & BOTTS, L.L.P.

98 DEC 31 PM 1:16

TO
[Signature]

Date of mailing (day/month/year) 10 November 1998 (10.11.98)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 31978-PCT	International application No. PCT/US98/20397

The applicant is hereby notified that the International Bureau has received the record copy of the international application as detailed below.

Name(s) of the applicant(s) and State(s) for which they are applicants:

THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK (for all designated
States except US)
BENES, Martin et al (for US)

International filing date : 30 September 1998 (30.09.98)
Priority date(s) claimed : 15 September 1998 (15.09.98)
Date of receipt of the record copy
by the International Bureau : 09 November 1998 (09.11.98)
List of designated Offices :

National : CA, JP, MX, US

ATTENTION

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In addition, the applicant's attention is drawn to the information contained in the Annex, relating to:

- ☒ time limits for entry into the national phase
- ☒ confirmation of precautionary designations
- ☒ requirements regarding priority documents

A copy of this Notification is being sent to the receiving Office and to the International Searching Authority.

ON DOCKET FOR

S/15/00

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer: G. Bähr
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

INFORMATION ON TIME LIMITS FOR ENTERING THE NATIONAL PHASE

The applicant is reminded that the "national phase" must be entered before each of the designated Offices indicated in the Notification of Receipt of Record Copy (Form PCT/IB/301) by paying national fees and furnishing translations, as prescribed by the applicable national laws.

The time limit for performing these procedural acts is **20 MONTHS** from the priority date or, for those designated States which the applicant elects in a demand for international preliminary examination or in a later election, **30 MONTHS** from the priority date, provided that the election is made before the expiration of 19 months from the priority date. Some designated (or elected) Offices have fixed time limits which expire even later than 20 or 30 months from the priority date. In other Offices an extension of time or grace period, in some cases upon payment of an additional fee, is available.

In addition to these procedural acts, the applicant may also have to comply with other special requirements applicable in certain Offices. It is the applicant's responsibility to ensure that the necessary steps to enter the national phase are taken in a timely fashion. Most designated Offices do not issue reminders to applicants in connection with the entry into the national phase.

For detailed information about the procedural acts to be performed to enter the national phase before each designated Office, the applicable time limits and possible extensions of time or grace periods, and any other requirements, see the relevant Chapters of Volume II of the PCT Applicant's Guide. Information about the requirements for filing a demand for international preliminary examination is set out in Chapter IX of Volume I of the PCT Applicant's Guide.

GR and ES became bound by PCT Chapter II on 7 September 1996 and 6 September 1997, respectively, and may, therefore, be elected in a demand or a later election filed on or after 7 September 1996 and 6 September 1997, respectively, regardless of the filing date of the international application. (See second paragraph above.)

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

CONFIRMATION OF PRECAUTIONARY DESIGNATIONS

This notification lists only specific designations made under Rule 4.9(a) in the request. It is important to check that these designations are correct. Errors in designations can be corrected where precautionary designations have been made under Rule 4.9(b). The applicant is hereby reminded that any precautionary designations may be confirmed according to Rule 4.9(c) before the expiration of 15 months from the priority date. If it is not confirmed, it will automatically be regarded as withdrawn by the applicant. There will be no reminder and no invitation. Confirmation of a designation consists of the filing of a notice specifying the designated State concerned (with an indication of the kind of protection or treatment desired) and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.

REQUIREMENTS REGARDING PRIORITY DOCUMENTS

For applicants who have not yet complied with the requirements regarding priority documents, the following is recalled.

Where the priority of an earlier national, regional or international application is claimed, the applicant must submit a copy of the said earlier application, certified by the authority with which it was filed ("the priority document") to the receiving Office (which will transmit it to the International Bureau) or directly to the International Bureau, before the expiration of 16 months from the priority date, provided that any such priority document may still be submitted to the International Bureau before that date of international publication of the international application, in which case that document will be considered to have been received by the International Bureau on the last day of the 16-month time limit (Rule 17.1(a)).

Where the priority document is issued by the receiving Office, the applicant may, instead of submitting the priority document, request the receiving Office to prepare and transmit the priority document to the International Bureau. Such request must be made before the expiration of the 16-month time limit and may be subjected by the receiving Office to the payment of a fee (Rule 17.1(b)).

If the priority document concerned is not submitted to the International Bureau or if the request to the receiving Office to prepare and transmit the priority document has not been made (and the corresponding fee, if any, paid) within the applicable time limit indicated under the preceding paragraphs, any designated State may disregard the priority claim, provided that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity to furnish the priority document within a time limit which is reasonable under the circumstances.

Where several priorities are claimed, the priority date to be considered for the purposes of computing the 16-month time limit is the filing date of the earliest application whose priority is claimed.

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From the INTERNATIONAL BUREAU OF PATENTS

PCT

To:

99 AUG 31 PM 11:47

NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT

(PCT Administrative Instructions, Section 411)

TANG, Henry
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
ÉTATS-UNIS D'AMÉRIQUE

Date of mailing (day/month/year) 23 August 1999 (23.08.99)	
Applicant's or agent's file reference 31978-PCT	IMPORTANT NOTIFICATION
International application No. PCT/US98/20397	International filing date (day/month/year) 30 September 1998 (30.09.98)
International publication date (day/month/year) Not yet published	Priority date (day/month/year) 15 September 1998 (15.09.98)
Applicant THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK et al	

1. The applicant is hereby notified of the date of receipt (except where the letters "NR" appear in the right-hand column) by the International Bureau of the priority document(s) relating to the earlier application(s) indicated below. Unless otherwise indicated by an asterisk appearing next to a date of receipt, or by the letters "NR" in the right-hand column, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).
2. This updates and replaces any previously issued notification concerning submission or transmittal of priority documents.
3. An asterisk(*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b). In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.
4. The letters "NR" appearing in the right-hand column denote a priority document which was not received by the International Bureau or which the applicant did not request the receiving Office to prepare and transmit to the International Bureau, as provided by Rule 17.1(a) or (b), respectively. In such a case, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

<u>Priority date</u>	<u>Priority application No.</u>	<u>Country or regional Office or PCT receiving Office</u>	<u>Date of receipt of priority document</u>
15 Sept 1998 (15.09.98)	607100,406	US	19 Augu 1999 (19.08.99)

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer G. Bähr
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

PATENT COOPERATION TREATY

3978
PCT

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

To:

TANG, Henry
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
ÉTATS-UNIS D'AMÉRIQUE

RECEIVED
BAKER & BOTTS, L.L.P.

99 AUG 10 PM 12:15

Date of mailing (day/month/year)

28 July 1999 (28.07.99)

Applicant's or agent's file reference

31978-PCT

IMPORTANT NOTIFICATION

International application No.

PCT/US98/20397

International filing date (day/month/year)

30 September 1998 (30.09.98)

1. The following indications appeared on record concerning:



the applicant



the inventor



the agent



the common representative

Name and Address

State of Nationality

State of Residence

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:



the person



the name



the address



the nationality



the residence

Name and Address

THE TRUSTEES OF PRINCETON
UNIVERSITY
P.O. Box 36
Princeton, NJ 08544-0036
United States of America

State of Nationality

US

State of Residence

US

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

The above-mentioned applicant has been added to the records as applicant for all designated States except for US.

4. A copy of this notification has been sent to:



the receiving Office



the International Searching Authority



the International Preliminary Examining Authority



the designated Offices concerned



the elected Offices concerned



other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

G. Bähr

Facsimile No.: (41-22) 740.14.35

Telephone No.: (41-22) 338.83.38

31978
PCT

PCT

From the INTERNATIONAL BUREAU

NOTICE INFORMING THE APPLICANT OF THE COMMUNICATION OF THE INTERNATIONAL APPLICATION TO THE DESIGNATED OFFICES

(PCT Rule 47.1(c), first sentence)

To:

TANG, Henry
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
ETATS-UNIS D'AMERIQUE

BAKER BOTTS L.L.P.

00 APR -1 PM 1:17

TO

[Handwritten signature]

Date of mailing (day/month/year) 23 March 2000 (23.03.00)		IMPORTANT NOTICE	
Applicant's or agent's file reference 31978-PCT			
International application No. PCT/US98/20397	International filing date (day/month/year) 30 September 1998 (30.09.98)	Priority date (day/month/year) 15 September 1998 (15.09.98)	
Applicant THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK et al			

1. Notice is hereby given that the International Bureau has communicated, as provided in Article 20, the international application to the following designated Offices on the date indicated above as the date of mailing of this Notice:
JP,US

In accordance with Rule 47.1(c), third sentence, those Offices will accept the present Notice as conclusive evidence that the communication of the international application has duly taken place on the date of mailing indicated above and no copy of the international application is required to be furnished by the applicant to the designated Office(s).

2. The following designated Offices have waived the requirement for such a communication at this time:
CA,MX

The communication will be made to those Offices only upon their request. Furthermore, those Offices do not require the applicant to furnish a copy of the international application (Rule 49.1(a-bis)).

3. Enclosed with this Notice is a copy of the international application as published by the International Bureau on 23 March 2000 (23.03.00) under No. WO 00/16486

REMINDER REGARDING CHAPTER II (Article 31(2)(a) and Rule 54.2)

If the applicant wishes to postpone entry into the national phase until 30 months (or later in some Offices) from the priority date, a demand for international preliminary examination must be filed with the competent International Preliminary Examining Authority before the expiration of 19 months from the priority date.

It is the applicant's sole responsibility to monitor the 19-month time limit.

Note that only an applicant who is a national or resident of a PCT Contracting State which is bound by Chapter II has the right to file a demand for international preliminary examination.

REMINDER REGARDING ENTRY INTO THE NATIONAL PHASE (Article 22 or 39(1))

If the applicant wishes to proceed with the international application in the national phase, he must, within 20 months or 30 months, or later in some Offices, perform the acts referred to therein before each designated or elected Office.

For further important information on the time limits and acts to be performed for entering the national phase, see the Annex to Form PCT/IB/301 (Notification of Receipt of Record Copy) and Volume II of the PCT Applicant's Guide.

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer: J. Zahra Telephone No. (41-22) 338.83.38
Facsimile No. (41-22) 740.14.35	Docketed For 5/15/2000 by

Encl. in packet

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONALE BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 22 May 2000 (22.05.00)	
International application No. PCT/US98/20397	Applicant's or agent's file reference 31978-PCT
International filing date (day/month/year) 30 September 1998 (30.09.98)	Priority date (day/month/year) 15 September 1998 (15.09.98)
Applicant BENES, Martin et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

29 March 2000 (29.03.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Kiwa Mpay
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ US

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only

Identification of IPEA	Date of receipt of DEMAND
------------------------	---------------------------

Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION		Applicant's or agent's file reference 31978-PCT
International application No. PCT/US98/20397	International filing date (day/month/year) 30 September 1998 (30.09.98)	(Earliest) Priority date (day/month/year) 15 September 1998 (15.09.98)

Title of invention
VARIABLE-LENGTH, HIGH-SPEED ASYNCHRONOUS DECODER CIRCUIT

Box No. II APPLICANT(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK 116th Street and Broadway New York, NY 10027 US	Telephone No.:
	Facsimile No.:
	Teleprinter No.:
State (that is, country) of nationality: US	State (that is, country) of residence: US

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) THE TRUSTEES OF PRINCETON UNIVERSITY Princeton University P.O. Box 36 Princeton, NJ 08544-0036 US	
State (that is, country) of nationality: US	State (that is, country) of residence: US

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) BENES, MARTIN 1541 Oxford Street, Apt. 303 Berkely, CA 94709 US	
State (that is, country) of nationality: CZ	State (that is, country) of residence: US

☒ Further applicants are indicated on a continuation sheet.

Continuation of Box No. II APPLICANT(S)

If none of the following sub-boxes is used, this sheet is not to be included in the demand.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

NOWICK, STEVEN M.
560 Riverside Drive, Apt. 16C
New York, NY 10027
US

State *(that is, country)* of nationality:
US

State *(that is, country)* of residence:
US

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

WOLFE, ANDREW
108 Leewood Court
Los Gatos, CA 95032
US

State *(that is, country)* of nationality:
US

State *(that is, country)* of residence:
US

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

State *(that is, country)* of nationality:

State *(that is, country)* of residence:



Further applicants are indicated on another continuation sheet.

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCEThe following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s) /common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: (Family name followed by given name; for a legal entity, full official designation.
The address must include postal code and name of country.)TANG, HENRY
Baker Botts LLP
30 Rockefeller Plaza
New York, NY 10112-0228
US

Telephone No.:

(212) 705-5000

Facsimile No.:

(212) 705-5020

Teleprinter No.:

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:***

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filedthe description ☐ as originally filed☐ as amended under Article 34the claims ☐ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☐ as amended under Article 34the drawings ☐ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). (This check-box may be marked only where the time limit under Article 19 has not yet expired.)

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English☒ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**

The applicant hereby elects all eligible States (that is, all States which have been designated and which are bound by Chapter II of the PCT)

excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|--|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other (specify) | : | sheets |

For International Preliminary Examining Authority use only

received

not received

☐☐☐☐☐☐☐☐☐☐☐☐

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 6. <input checked="" type="checkbox"/> other (specify): Transmittal Letter |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).


Henry Tang (Agent)

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.

☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

PCT

FEE CALCULATION SHEET

Annex to the Demand for international preliminary examination

International application No. PCT/US98/20397	For International Preliminary Examining Authority use only	
Applicant's or agent's file reference 31978-PCT	Date stamp of the IPEA	
Applicant THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK ET AL.		
Calculation of prescribed fees		
1. Preliminary examination fee	490.00	<input type="checkbox"/> P
2. Handling fee <i>(Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.)</i>	153.00	<input type="checkbox"/> H
3. Total of prescribed fees Add the amounts entered at P and H and enter total in the TOTAL box	643.00	
		TOTAL
Mode of Payment		
<input type="checkbox"/> authorization to charge deposit account with the IPEA (see below)	<input type="checkbox"/> cash	
<input checked="" type="checkbox"/> cheque	<input type="checkbox"/> revenue stamps	
<input type="checkbox"/> postal money order	<input type="checkbox"/> coupons	
<input type="checkbox"/> bank draft	<input type="checkbox"/> other (specify):	
Deposit Account Authorization <i>(this mode of payment may not be available at all IPEAs)</i>		
The IPEA/ <u>US</u> <input type="checkbox"/> is hereby authorized to charge the total fees indicated above to my deposit account.		
<input checked="" type="checkbox"/> <i>(this check-box may be marked only if the conditions for deposit accounts of the IPEA so permit)</i> is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.		
02-4377	29 March 2000	
Deposit Account Number	Date (day/month/year)	Signature

PATENT COOPERATION TREATY

BAKER BOTTS L.L.P. M

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

00 MAY 11 AM 11:18

PCT

TO

NOTIFICATION OF RECEIPT
OF DEMAND BY COMPETENT INTERNATIONAL
PRELIMINARY EXAMINING AUTHORITY(PCT Rules 59.3(e) and 61.1(b), first sentence
and Administrative Instructions, Section 601(a))To:
HENRY TANG
BAKER & BOTTS, LLP
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112Date of mailing
(day/month/year)

08 MAY 2000

Applicant's or agent's file reference

31978-PCT

IMPORTANT NOTIFICATION

International application No.

PCT/US98/20397

International filing date (day/month/year)

30 SEP 98

Priority date (day/month/year)

15 SEP 98

Applicant

THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF & NEW YORK

1. The applicant is hereby notified that this International Preliminary Examining Authority considers the following date as the date of receipt of the demand for international preliminary examination of the international application:

29 MAR 2000 (29.03.00)

Docketed

For 618/2000 By *ml*

2. That date of receipt is:



the actual date of receipt of the demand by this Authority (Rule 61.1(b)).



the actual date of receipt of the demand on behalf of this Authority (Rule 59.3(e)).



the date on which this Authority has, in response to the invitation to correct defects in the demand (Form PCT/IPEA/404), received the required corrections.

3. ☐ **ATTENTION:** That date of receipt is **AFTER** the expiration of 19 months from the priority date. Consequently, the election(s) made in the demand does (do) not have the effect of postponing the entry into the national phase until 30 months from the priority date (or later in some Offices) (Article 39(1)). Therefore, the acts for entry into the national phase must be performed within 20 months from the priority date (or later in some Offices) (Article 22). For details, see the *PCT Applicant's Guide*, Volume II.



(If applicable) This notification confirms the information given by telephone, facsimile transmission or in person on:

4. Only where paragraph 3 applies, a copy of this notification has been sent to the International Bureau.

Name and mailing address of the IPEA/
Assistant Commissioner for Patent
Box PCT
Washington, D.C. 20231 Attn:RO/US
Facsimile No. 703-305-3230Authorized officer
J. M. S.

Sections - IAPD Team 1

Telephone No. 703-305-3664 703-305-3230 (ext.)

Form PCT/IPEA/402 (July-1998)

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To: HENRY TANG
BAKER & BOTTS, LLP
30 ROCKEFELLER PLAZA
NEW YORK NY 10112

PCT

WRITTEN OPINION

(PCT Rule 66)

Applicant's or agent's file reference 31978-PCT		Date of Mailing (day/month/year) 24 JUL 2000
REPLY DUE within TWO months from the above date of mailing		
International application No. PCT/US98/20397	International filing date (day/month/year) 30 SEPTEMBER 1998	Priority date (day/month/year) 15 SEPTEMBER 1998
International Patent Classification (IPC) or both national classification and IPC IPC(7): H03M 7/40; G06F 7/00, 7/38 and US Cl.: 341/65, 67; 364/715.02, 715.011, 749		
Applicant THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK		

1. This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.

2. This opinion contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step or industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Docketed
For 9/124/2000 By *ml*

3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. ~~The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).~~

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.

4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 15 JANUARY 2001

Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer WILLIAM GRANT <i>Rugenia Logan</i>
Facsimile No. (703) 305-3230	Telephone No. (703) 308-6608

I. Basis of the opinion**1. With regard to the elements of the international application:***☒ the international application as originally filed☒ the description:

pages 1-35 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the claims:

pages 36-39 , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the drawings:

pages 1-24 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

☒ the sequence listing part of the description:

pages NONE , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
☐ the language of publication of the international application (under Rule 48.3(b)).
☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority in written form.
☐ furnished subsequently to this Authority in computer readable form.
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

☒ the description, pages NONE
☒ the claims, Nos. NONE
☒ the drawings, sheets/fig NONE

5. ☐ This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. statement

Novelty (N)

Claims 2-12 YES
Claims 1, 13-14 NO

Inventive Step (IS)

Claims 2-12 YES
Claims 1, 13-14 NO

Industrial Applicability (IA)

Claims 1-14 YES
Claims NONE NO

2. citations and explanations

Claims 1, 13-14 lack an inventive step under PCT Article 33(3) as being obvious over Williams (US 5,671,151) in view of Shikakura (US 5,600,374).

Shikakura teaches a decoding circuit having: an input buffer for receiving input data coded using a variable-length coding technique and an output buffer coupled to the output of said logic circuit(col.7, lines 10-13);

William teaches a logic circuit coupled to the output of said input buffer comprising a plurality of computational logic stages for decoding said input data, said plurality of computational logic stages arranged in one or more computational threads, at least one of said computational threads being arranged as a self-timed ring wherein each computational logic stage in said ring produces a completion signal indicating either completion or non-completion of said computation logic stage, the completion signal of each computational logic stage being coupled to a previous computational logic stage in said ring, said previous computational logic stage performing control operations when said completion signal indicates completion and performing evaluation of its inputs when said completion signal indicates non-completion (col.8, lines 40-43);

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Shikakura with those of William because a decoding circuit is able to decode data in a variety of ways to include data using a timed ring. These input and output buffers can be represented as cache in a microprocessor system.

Claims 2-12 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest a decoder circuit comprising:

- a. a first logic circuit coupled to the output of said alignment circuit for decoding said coded, variable-length data words;
- b. a second logic circuit coupled to the output of said (Continued on Supplemental Sheet.)

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Sheet 10

Continuation of: Boxes I - VIII

TIME LIMIT:

The time limit set for response to a Written Opinion may not be extended. 37 CFR 1.484(d). Any response received after the expiration of the time limit set in the Written Opinion will not be considered in preparing the International Preliminary Examination Report.

V. 2. REASONED STATEMENTS - CITATIONS AND EXPLANATIONS (Continued):

alignment circuit for determining the length of said coded, variable-length data words;

c. a register;

d. an adder circuit coupled to the output of said register and output of said second logic circuit, the output of said adder circuit coupled to the input of said register and to the control input of said alignment circuit.

----- NEW CITATIONS -----

NONE



REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum) 31978-PCT

Box No. I TITLE OF INVENTION

A HIGH-SPEED ASYNCHRONOUS DECODER CIRCUIT FOR VARIABLE-LENGTH CODED DATA

Box No. II APPLICANT

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK
116th Street and Broadway
New York, NY 10027
US

☐ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:
US

State (that is, country) of residence:
US

This person is applicant for the purposes of: ☐ all designated States ☒ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

BENES, MARTIN
1541 Oxford Street, Apt. 303
Berkely, CA 94709
US

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
CZ

State (that is, country) of residence:
US

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

☒ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:

☒ agent ☐ common representative

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)

TANG, HENRY and
RENNA, LEONARDO
Baker & Botts, LLP
30 Rockefeller Plaza
New York, NY 10112-0228
US

Telephone No.
(212) 705-5000

Facsimile No.
(212) 705-5020

Teleprinter No.

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Continuation of Box I FURTHER APPLICANTS AND/OR (OTHER) INVENTOR(S)

If none of the following sub-boxes is used, this sheet is not to be included in the request.

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

NOWICK, STEVEN M.
560 Riverside Drive, Apt. 16C
New York, NY 10027
US

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
US

State (that is, country) of residence:
US

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

WOLFE, ANDREW
108 Leewood Court
Los Gatos, CA 95032
US

This person is:

- ☐ applicant only
☒ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:
US

State (that is, country) of residence:
US

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☒ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

This person is:

- ☐ applicant only
☐ applicant and inventor
☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

State (that is, country) of residence:

This person is applicant for the purposes of: ☐ all designated States ☐ all designated States except the United States of America ☐ the United States of America only ☐ the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on another continuation sheet.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable boxes; at least one must be marked):

Regional Patent

- ☐ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☐ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☐ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☐ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|---|---|
| <input type="checkbox"/> AL Albania | <input type="checkbox"/> LS Lesotho |
| <input type="checkbox"/> AM Armenia | <input type="checkbox"/> LT Lithuania |
| <input type="checkbox"/> AT Austria | <input type="checkbox"/> LU Luxembourg |
| <input type="checkbox"/> AU Australia | <input type="checkbox"/> LV Latvia |
| <input type="checkbox"/> AZ Azerbaijan | <input type="checkbox"/> MD Republic of Moldova |
| <input type="checkbox"/> BA Bosnia and Herzegovina | <input type="checkbox"/> MG Madagascar |
| <input type="checkbox"/> BB Barbados | <input type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input type="checkbox"/> BG Bulgaria | |
| <input type="checkbox"/> BR Brazil | <input type="checkbox"/> MN Mongolia |
| <input type="checkbox"/> BY Belarus | <input type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> MX Mexico |
| <input type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input type="checkbox"/> NO Norway |
| <input type="checkbox"/> CN China | <input type="checkbox"/> NZ New Zealand |
| <input type="checkbox"/> CU Cuba | <input type="checkbox"/> PL Poland |
| <input type="checkbox"/> CZ Czech Republic | <input type="checkbox"/> PT Portugal |
| <input type="checkbox"/> DE Germany | <input type="checkbox"/> RO Romania |
| <input type="checkbox"/> DK Denmark | <input type="checkbox"/> RU Russian Federation |
| <input type="checkbox"/> EE Estonia | <input type="checkbox"/> SD Sudan |
| <input type="checkbox"/> ES Spain | <input type="checkbox"/> SE Sweden |
| <input type="checkbox"/> FI Finland | <input type="checkbox"/> SG Singapore |
| <input type="checkbox"/> GB United Kingdom | <input type="checkbox"/> SI Slovenia |
| <input type="checkbox"/> GE Georgia | <input type="checkbox"/> SK Slovakia |
| <input type="checkbox"/> GH Ghana | <input type="checkbox"/> SL Sierra Leone |
| <input type="checkbox"/> GM Gambia | <input type="checkbox"/> TJ Tajikistan |
| <input type="checkbox"/> GW Guinea-Bissau | <input type="checkbox"/> TM Turkmenistan |
| <input type="checkbox"/> HR Croatia | <input type="checkbox"/> TR Turkey |
| <input type="checkbox"/> HU Hungary | <input type="checkbox"/> TT Trinidad and Tobago |
| <input type="checkbox"/> ID Indonesia | <input type="checkbox"/> UA Ukraine |
| <input type="checkbox"/> IL Israel | <input type="checkbox"/> UG Uganda |
| <input type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> JP Japan | |
| <input type="checkbox"/> KE Kenya | <input type="checkbox"/> UZ Uzbekistan |
| <input type="checkbox"/> KG Kyrgyzstan | <input type="checkbox"/> VN Viet Nam |
| <input type="checkbox"/> KP Democratic People's Republic of Korea | <input type="checkbox"/> YU Yugoslavia |
| | <input type="checkbox"/> ZW Zimbabwe |
| <input type="checkbox"/> KR Republic of Korea | |
| <input type="checkbox"/> KZ Kazakhstan | |
| <input type="checkbox"/> LC Saint Lucia | |
| <input type="checkbox"/> LK Sri Lanka | |
| <input type="checkbox"/> LR Liberia | |

Check-boxes reserved for designating States (for the purposes of a national patent) which have become party to the PCT after issuance of this sheet:

- ☐ GD Grenada
- ☐

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

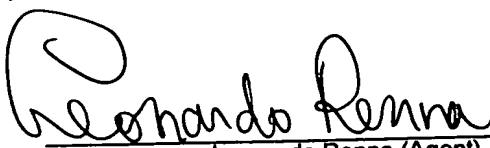
Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 15 September 1998	UNKNOWN	US		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): (1)

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY	
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):	Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):
ISA/ US	Date (day/month/year) Number Country (or regional Office)

Box No. VIII CHECK LIST: LANGUAGE OF FILING	
This international application contains the following number of sheets:	This international application is accompanied by the item(s) marked below:
request : 4	1. <input checked="" type="checkbox"/> fee calculation sheet
description (excluding sequence listing part) : 35	2. <input type="checkbox"/> separate signed power of attorney
claims : 4	3. <input type="checkbox"/> copy of general power of attorney; reference number, if any:
abstract : 1	4. <input type="checkbox"/> statement explaining lack of signature
drawings : 24	5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s):
sequence listing part of description : _____	6. <input type="checkbox"/> translation of international application into (language):
Total number of sheets : 68	7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material
	8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form
	9. <input checked="" type="checkbox"/> other (specify): Transmittal Letter
Figure of the drawings which should accompany the abstract:	Language of filing of the international application: English

Box No. IX SIGNATURE OF APPLICANT OR AGENT
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).
 Leonardo Renna (Agent)

For receiving Office use only		2. Drawings:
1. Date of actual receipt of the purported international application:		<input type="checkbox"/> received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		<input type="checkbox"/> not received:
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA/	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid	

For International Bureau use only
Date of receipt of the record copy by the International Bureau:

PCT

FEE CALCULATION SHEET

Annex to the Request

For receiving Office use only

International application No.

Date stamp of the receiving Office

Applicant's or agent's
file reference

31978-PCT

Applicant

THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK

CALCULATION OF PRESCRIBED FEES

1. TRANSMITTAL FEE

240.00 T

2. SEARCH FEE

450.00 S

International search to be carried out by US

(If two or more International Searching Authorities are competent in relation to the international application, indicate the name of the Authority which is chosen to carry out the international search.)

3. INTERNATIONAL FEE

Basic Fee

The international application contains 68 sheets.

first 30 sheets

455.00 b₁

38 x \$10.00 = 380.00 b₂
remaining sheets additional amount

Add amounts entered at b₁ and b₂ and enter total at B

835.00 B

Designation Fees

The international application contains 4 designations.

4 x 105.00 = 420.00 D
number of designation fees amount of designation fee payable (maximum 11)

420.00 D

Add amounts entered at B and D and enter total at I

1,255.00 I

(Applicants from certain States are entitled to a reduction of 75% of the international fee. Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 25% of the sum of the amounts entered at B and D)

4. FEE FOR PRIORITY DOCUMENT (if applicable)

15.00 P

5. TOTAL FEES PAYABLE

Add amounts entered at T, S, I and P, and enter total in the TOTAL box

1,960.00

TOTAL

☐ The designation fees are not paid at this time.

MODE OF PAYMENT

☐ authorization to charge
deposit account (see below)

☐ bank draft

☐ coupons

☒ cheque

☐ cash

☐ other (specify):

☐ postal money order

☐ revenue stamps

DEPOSIT ACCOUNT AUTHORIZATION (this mode of payment may not be available at all receiving Offices)

The RO/ US ☐ is hereby authorized to charge the total fees indicated above to my deposit account.

☒ is hereby authorized to charge any deficiency or credit any overpayment in the total fees indicated above to my deposit account.

☐ is hereby authorized to charge the fee for preparation and transmittal of the priority document to the International Bureau of WIPO to my deposit account.

02-4377

30 September 1998

Deposit Account Number

Date (day/month/year)

Signature

PATENT COOPERATION TREATY

99 MAY 25 PM 1:14

From the INTERNATIONAL SEARCHING AUTHORITY

To: HENRY TANG
BAKER & BOTTS, LLP
30 ROCKEFELLER PLAZA
NEW YORK NY 10112

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference 31978-PCT	Date of Mailing (day/month/year) 20 MAY 1999
International application No. PCT/US98/20397	International filing date (day/month/year) 30 SEPTEMBER 1998
Applicant THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK	

1. ☒ The applicant is hereby notified that the international search report has been established and is transmitted herewith.
 Filing of amendments and statement under Article 19:
 The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):
 When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the international search report; however, for more details, see the notes on the accompanying sheet.
 Where? Directly to the International Bureau of WIPO
 34, chemin des Colombettes
 1211 Geneva 20, Switzerland
 Facsimile No.: (41-22) 740.14.35
 For more detailed instructions, see the notes on the accompanying sheet.
2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.
3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
 - ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
 - ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.
4. Further action(s): The applicant is reminded of the following:
 - Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in rules 90 bis 1 and 90 bis 3, respectively, before the completion of the technical preparations for international publication.
 - Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).
 - Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer William Grant <i>Ruggerio Zogno</i>
Facsimile No. (703) 305-3230	Telephone No. (703) 308-1108

Form PCT/ISA/220 (January 1994) *

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(See notes on accompanying sheet)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 31978-PCT	<div style="display: flex; justify-content: space-between;"> <div>FOR FURTHER ACTION</div> <div>see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.</div> </div>	
International application No. PCT/US98/20397	International filing date (day/month/year) 30 SEPTEMBER 1998	(Earliest) Priority Date (day/month/year) 15 SEPTEMBER 1998
Applicant THE TRUSTEES OF COLUMBIA UNIVERSITY IN THE CITY OF NEW YORK		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (See Box I).
2. ☐ Unity of invention is lacking (See Box II).
3. ☐ The international application contains disclosure of a nucleotide and/or amino acid sequence listing and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.
☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ transcribed by this Authority.

4. With regard to the title,

☐ the text is approved as submitted by the applicant.
☒ the text has been established by this Authority to read as follows:

VARIABLE-LENGTH, HIGH-SPEED ASYNCHRONOUS DECODER CIRCUIT

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.
☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is:

Figure No. 3

☐ as suggested by the applicant.
☒ because the applicant failed to suggest a figure.
☐ because this figure better characterizes the invention.

☐ None of the figures.

Box III TEXT OF THE ABSTRACT (Continuation of item 5 of the first sheet)

The technical features mentioned in the abstract do not include a reference sign between parentheses (PCT Rule 8.1(d)).

New Abstract

There is disclosed a decoder circuit (20) for decoding input data coded using a variable length coding technique, such as Huffman coding. The decoder circuit (20) comprises an input buffer (100), a logic circuit (150) coupled to the input buffer (100), and an output buffer (700) coupled to the logic circuit (750). The logic circuit (750) includes a plurality of computational logic stages for decoding the input data, the plurality of computational logic stages arranged in one or more computational threads. At least one of the computational threads is arranged as a self-timed ring, wherein each computational logic stage in the ring produces a completion signal indicating either completion or non-completion of the computational logic of the associated computational logic stage. Each completion signal is coupled to a previous computational logic stage in the ring. The previous computational logic stage performs control operations when the completion signal indicates completion and performs evaluation of its inputs when the completion signal indicates non-completion.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/20397

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H03M 7/40; G06F 7/00, 7/38
US CL : 341/65, 67; 364/715.02, 715.011, 749
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,671,151 A (WILLIAMS) 23 September 1997, col. 5, line 9 to col. 6, line 16; col. 8, lines 40-43.	1,2,11-14
Y	US 5,600,374 A (SHIKAKURA) 04 February 1997, col. 7, lines 10-13.	1-14
Y	US 5,625,355 A (TAKENO et al) 29 April 1997, col. 1, line 64 to col. 2, line 31.	1-14
Y	US 5,513,132 A (WILLIAMS) 30 April 1996, col. 3, lines 16-27.	3
Y	US 5,351,134 A (YAGUCHI et al) 27 September 1994, col. 11, lines 29-35.	2-12

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

14 JANUARY 1999

Date of mailing of the international search report

20 MAY 1999

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231
Facsimile No. (703) 305-3230

Authorized officer

William Grant

Telephone No. (703) 308-1108

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/20397

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,801,650 A (NAKAYAMA) 01 September 1998 , col. 2, lines 36-46; col. 7, lines 1-4.	6,7
Y	US 5,231,485 A (ISRAELSEN et al) 27 July 1993 , col. 10, lines 7-35.	10
Y	US 5,343,413 A (INOUE) 30 August 1994 , col. 3, lines 54-65.	4
Y	US 4,499,553 (DICKINSON et al) 12 February 1985, col. 61, lines 9-22, and col. 62, lines 5-12.	8-10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/20397

B. FIELDS SEARCHED

Minimum documentation searched
Classification System: U.S.

APS - input buffer, self-timed ring, comput? thread, logic circuit, decoder circuit, variable-length, decompression, compression, adder circuit, output buffer, alignment circuit, first and second logic circuit, asynchronous communication, asynchronous decoder, barrel shifter, alignment circuit, huffmann, tree, output.

NOTES TO FORM PCT/ISA/220 (continued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under Article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

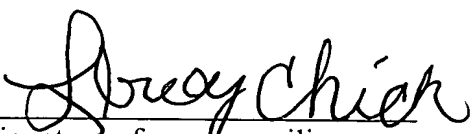
Applicants : BENES, Martin et al.
Serial No. : To be assigned
Filed : September 30, 1998
For : VARIABLE-LENGTH, HIGH-SPEED
ASYNCHRONOUS DECODER CIRCUIT

EXPRESS MAIL CERTIFICATION

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Signature of person mailing
correspondence

Name of person mailing correspondence: LEROY CHICK

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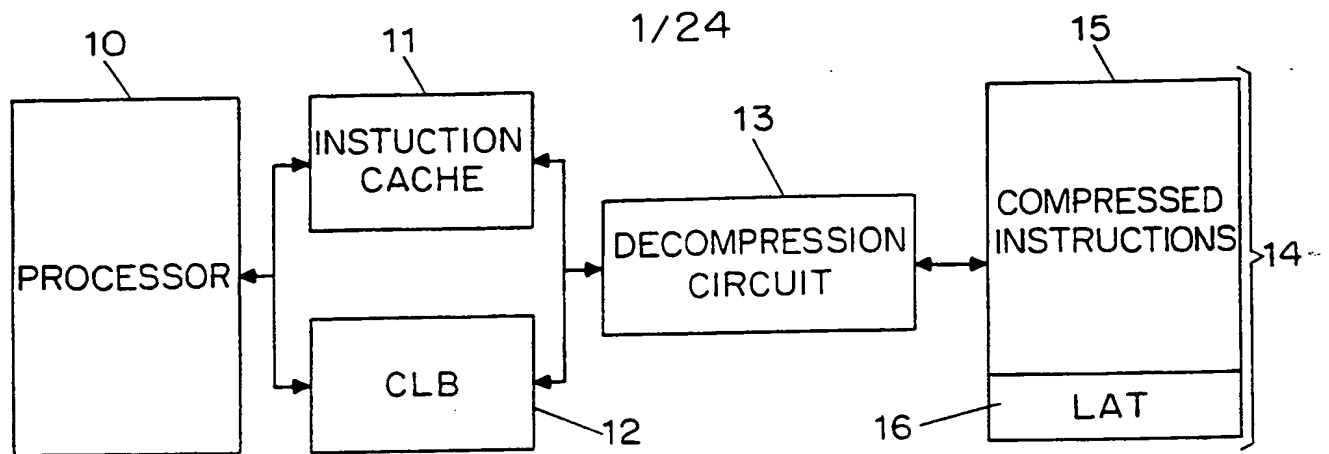


FIG. 1

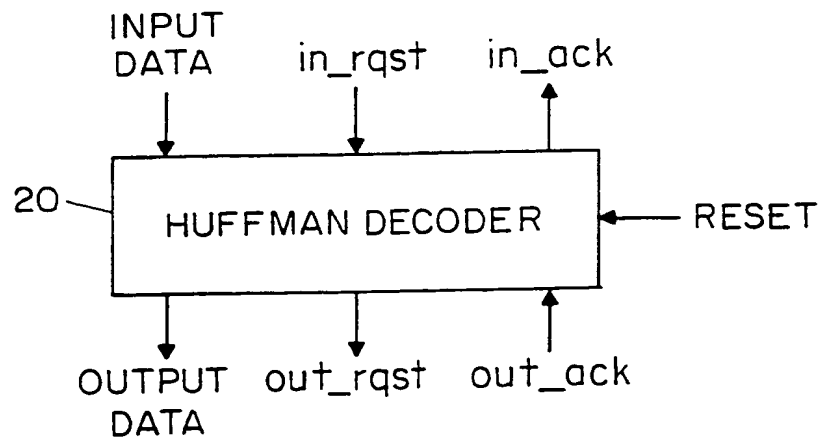


FIG. 2a

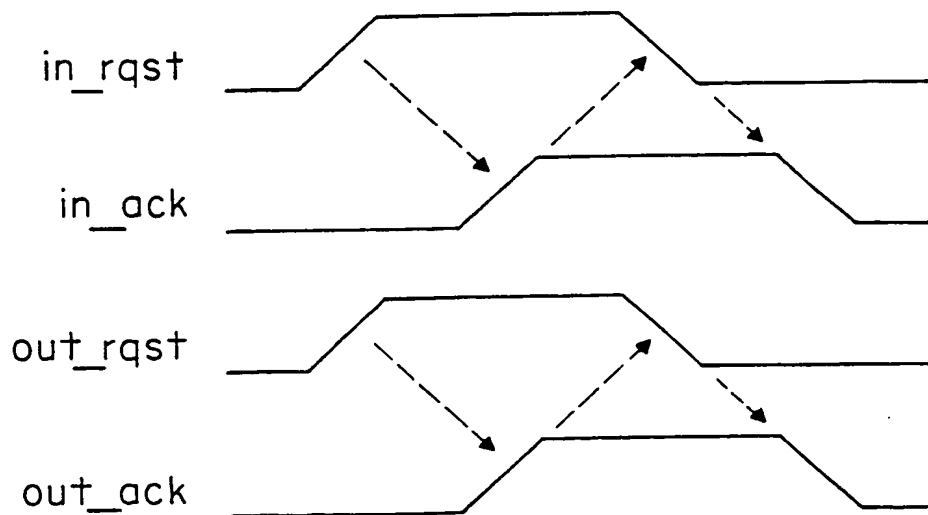


FIG. 2b

2/24

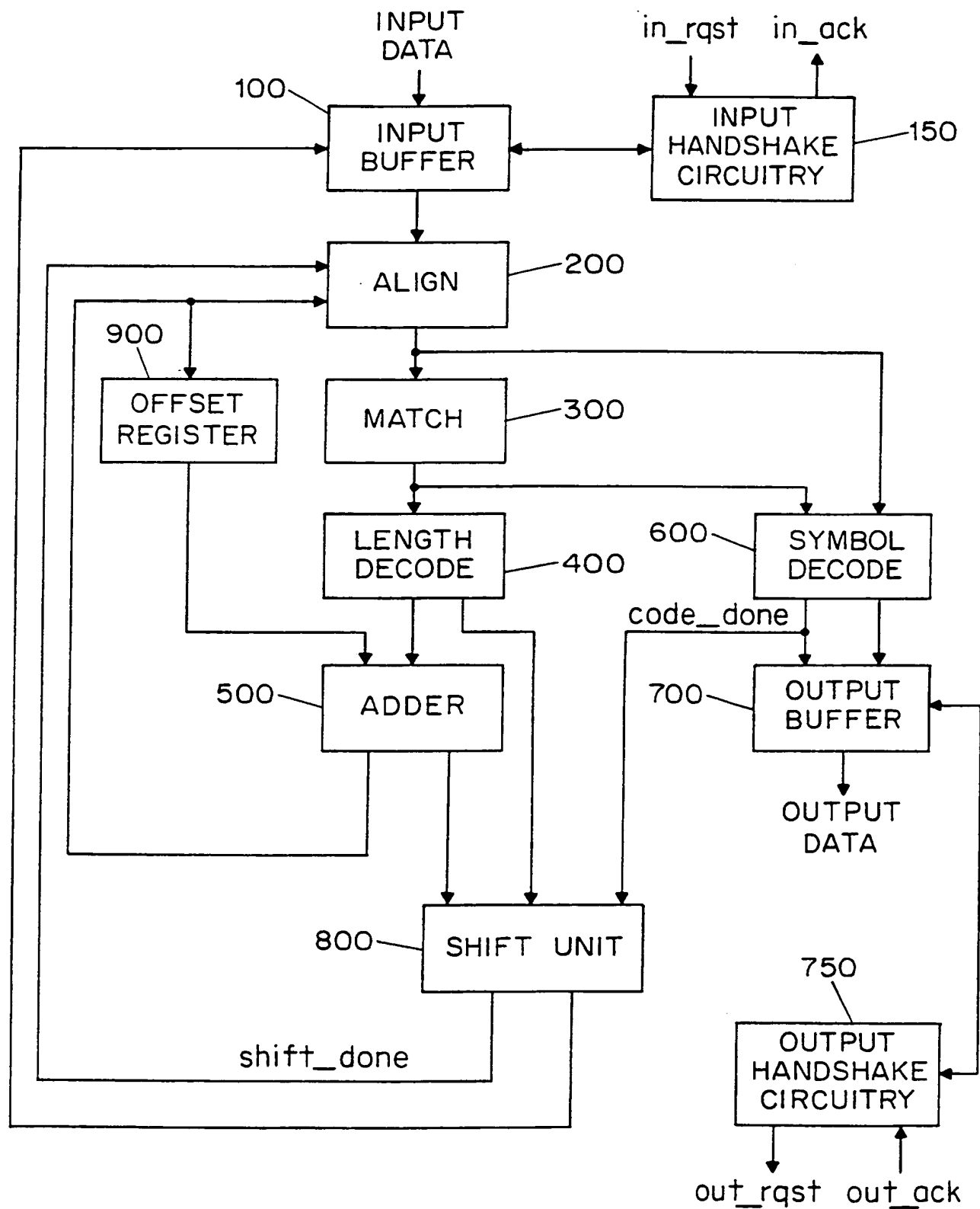


FIG. 3

3/24

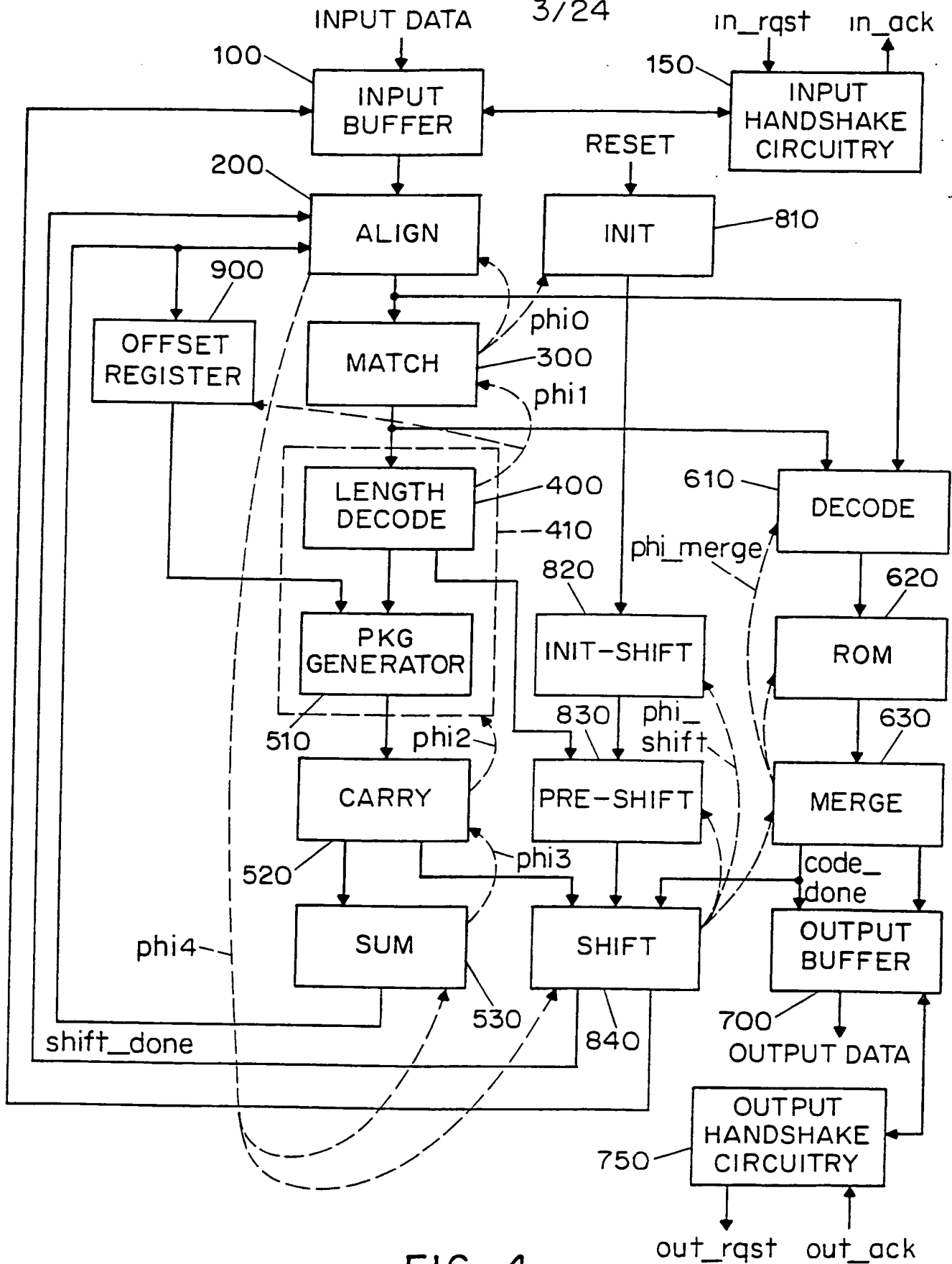


FIG. 4

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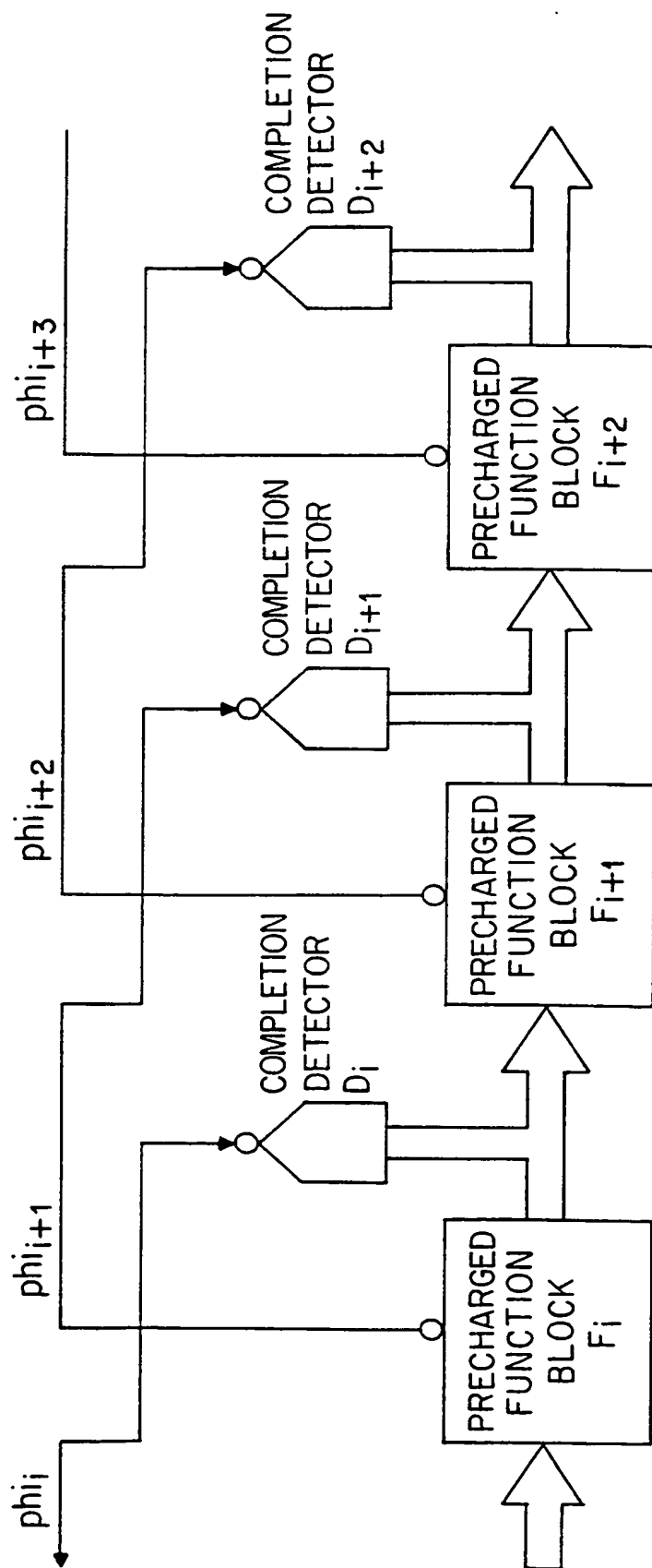


FIG. 5

5/24

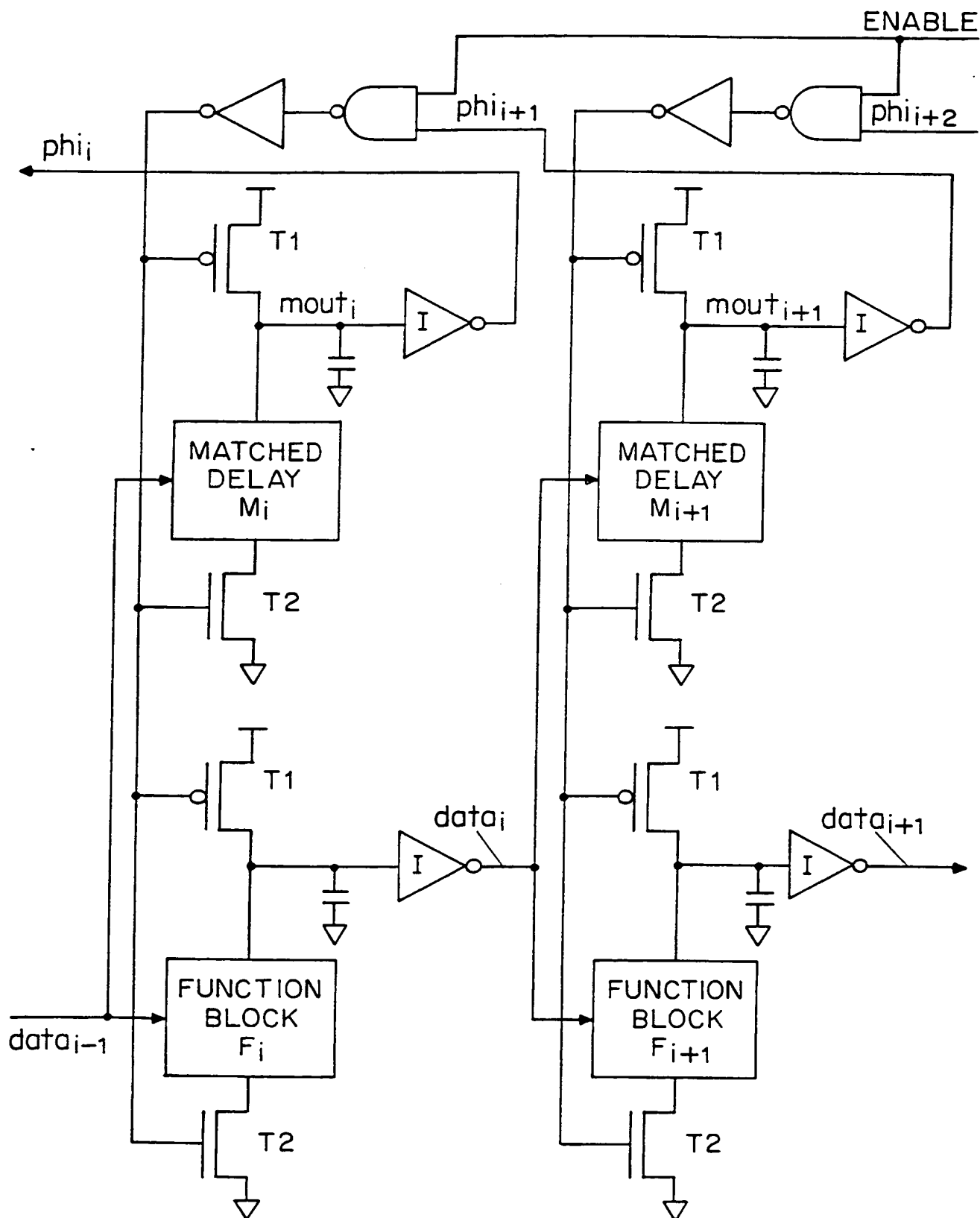


FIG. 6

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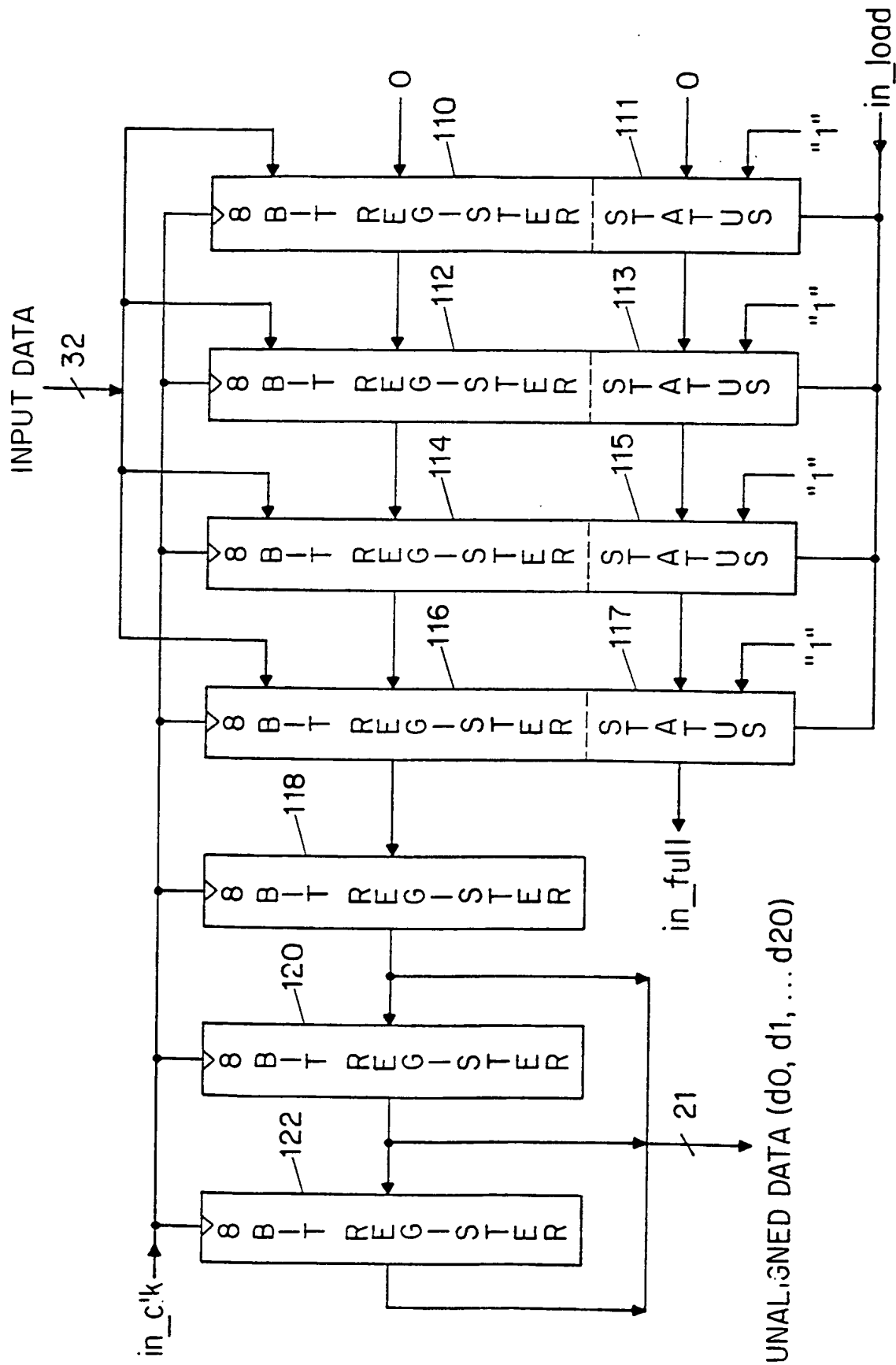


FIG. 7

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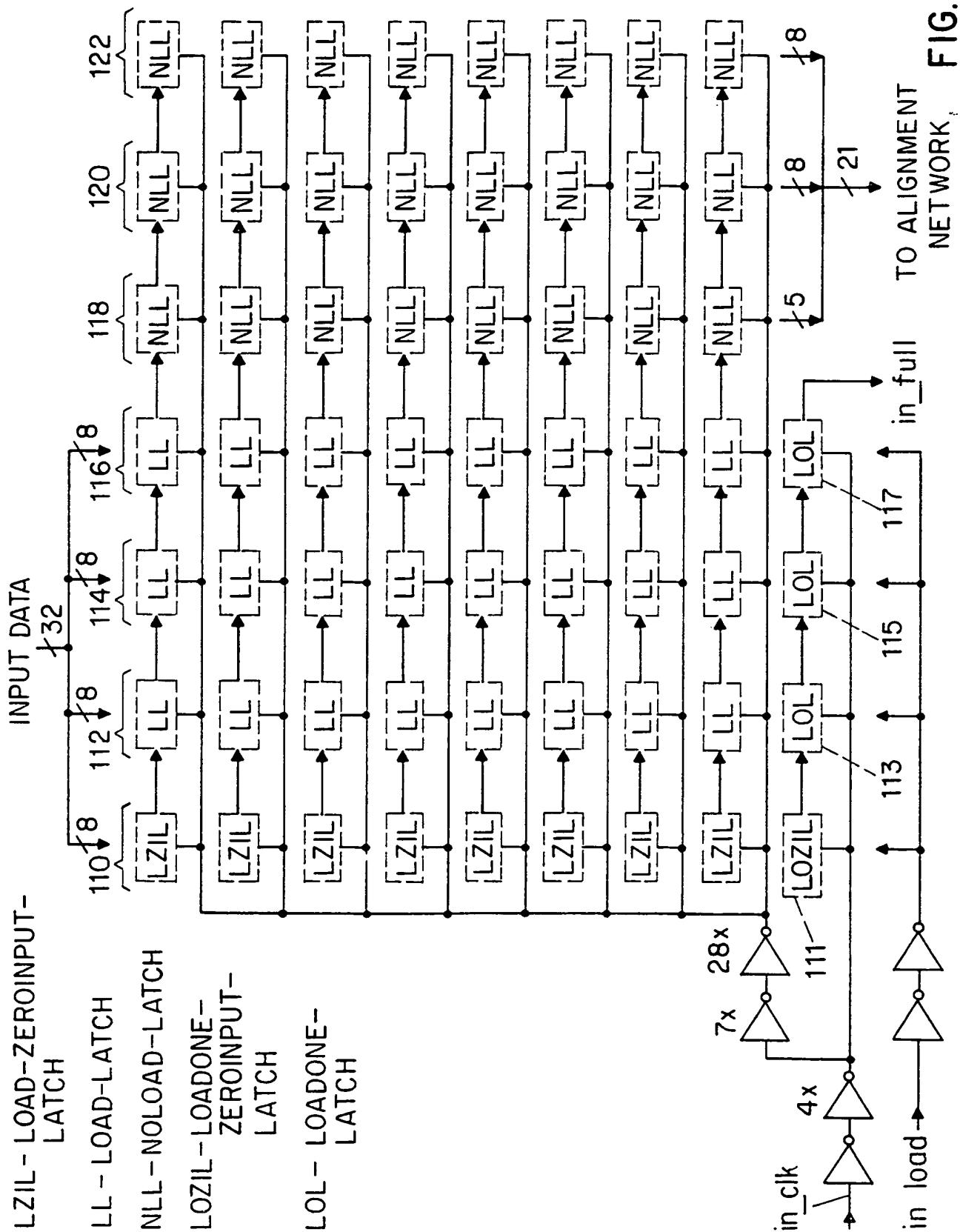


FIG. 8

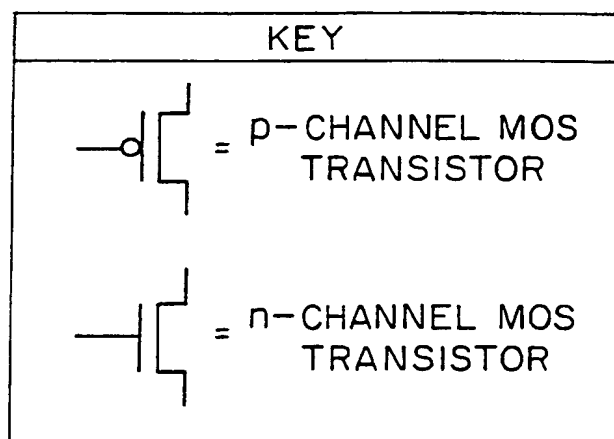
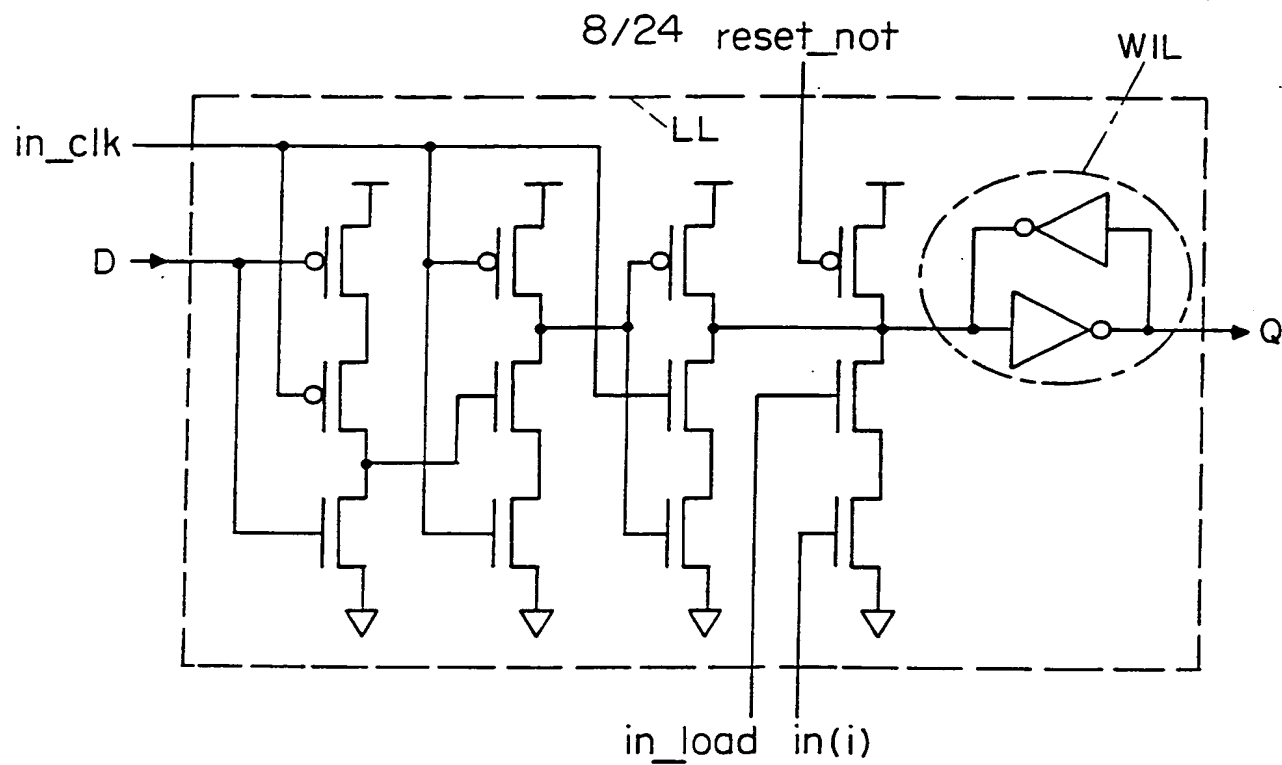


FIG. 9

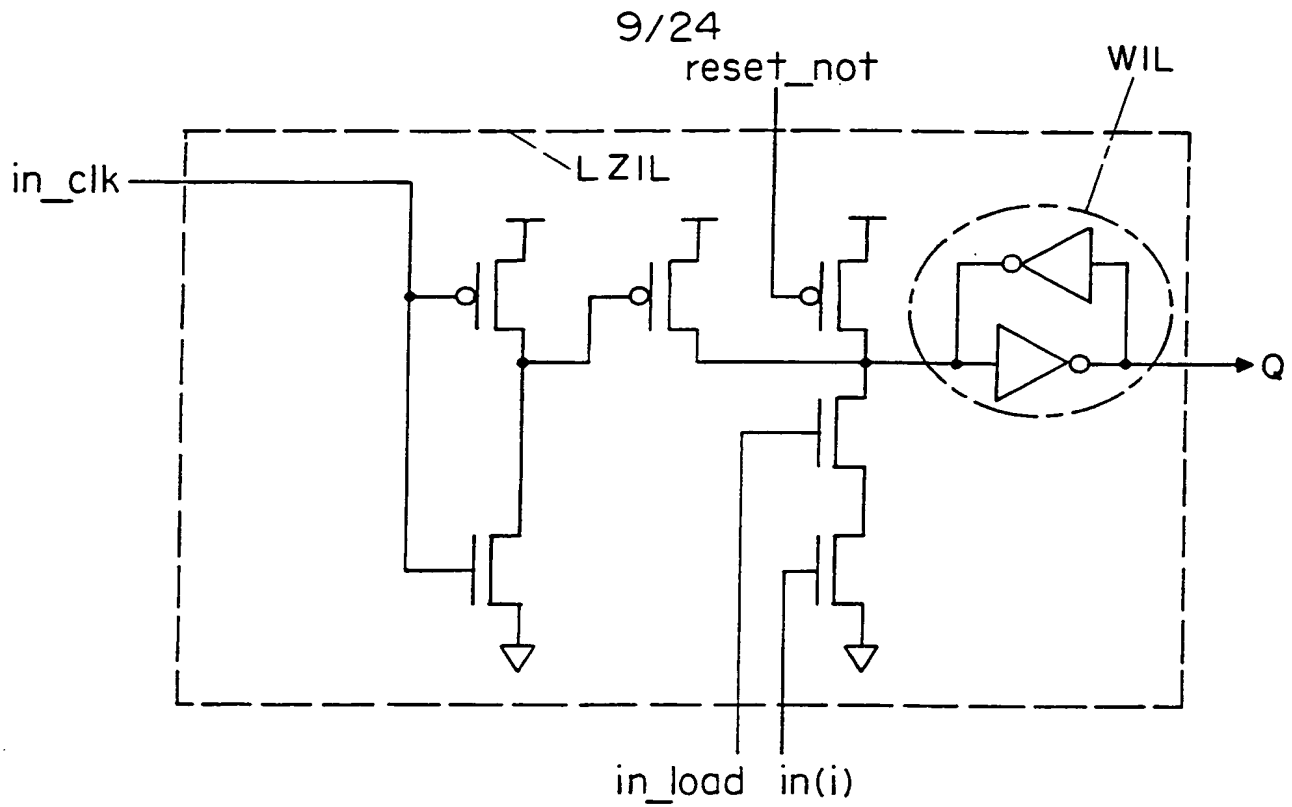


FIG. 10

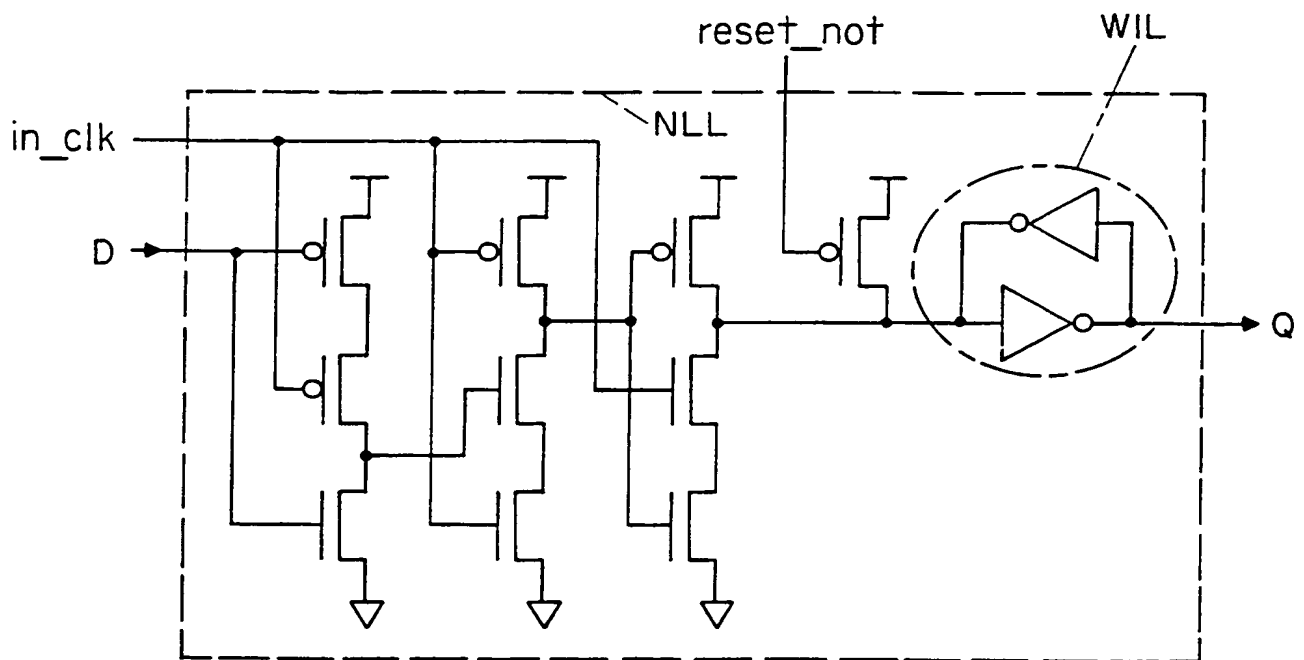


FIG. 11

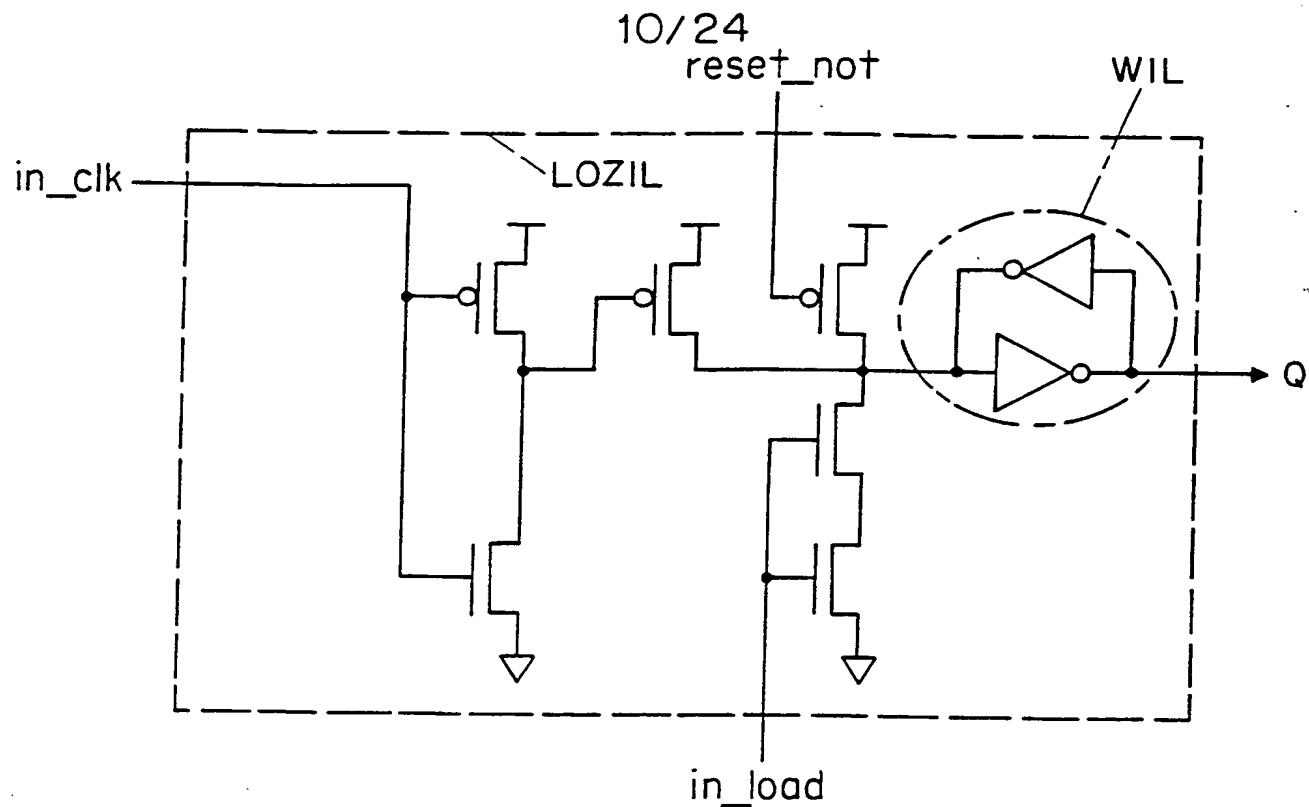


FIG. 12

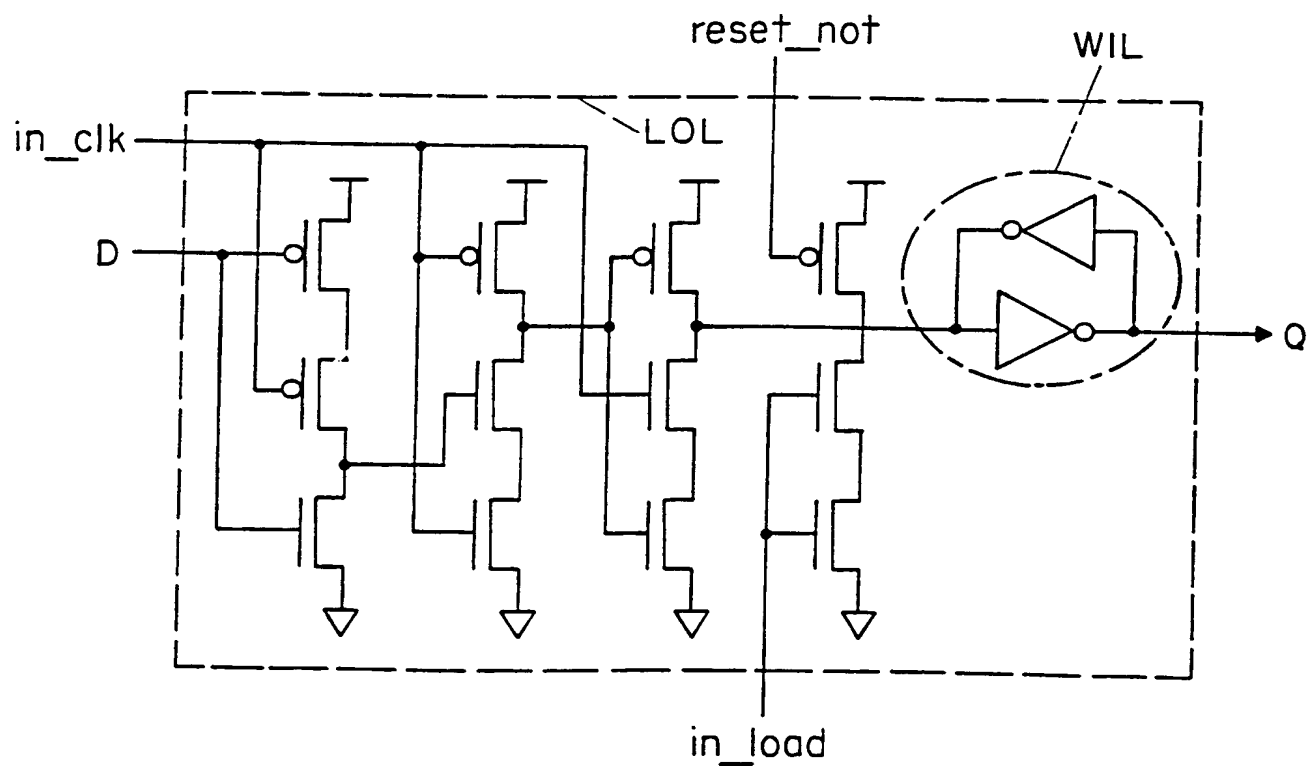


FIG. 13

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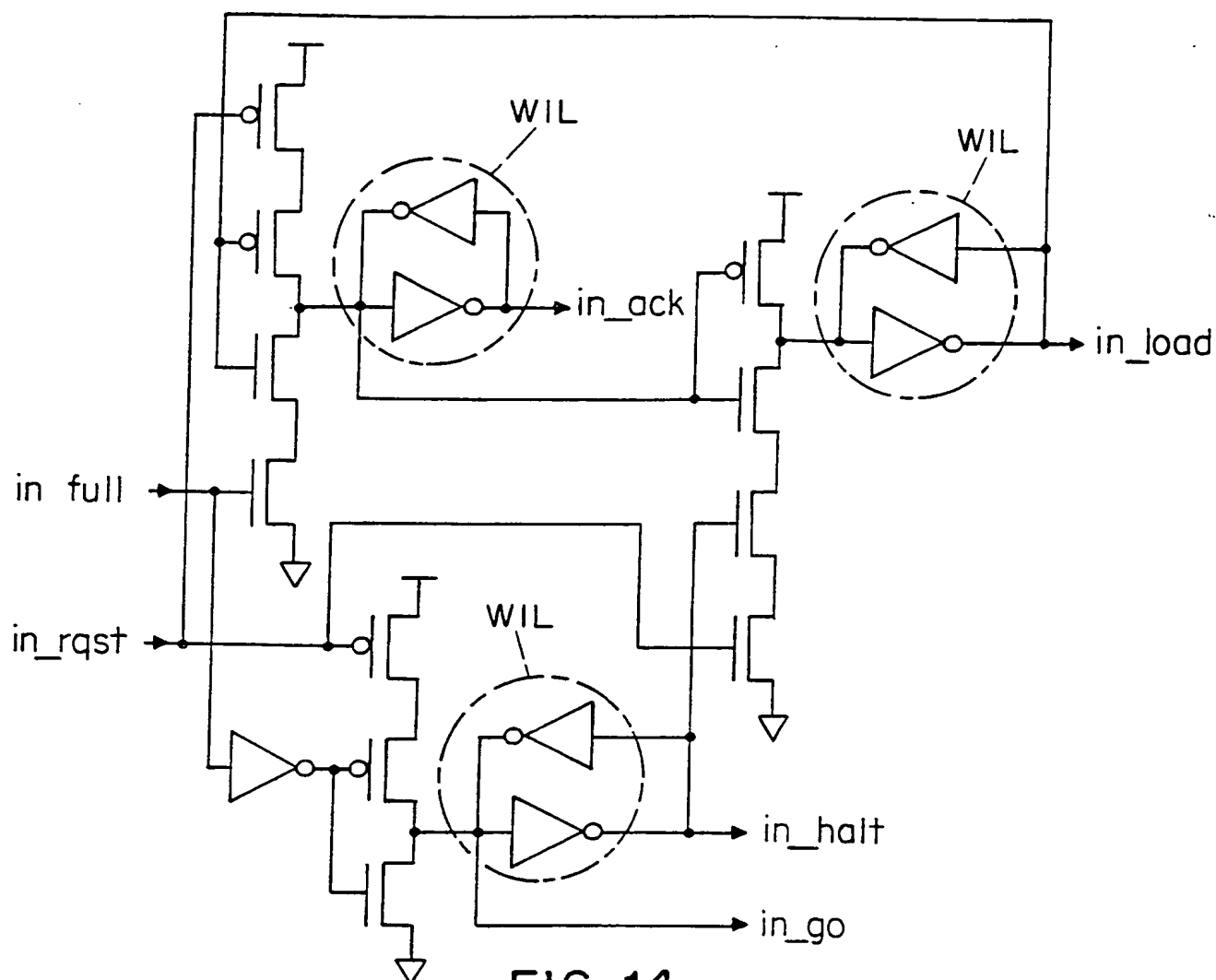


FIG. 14

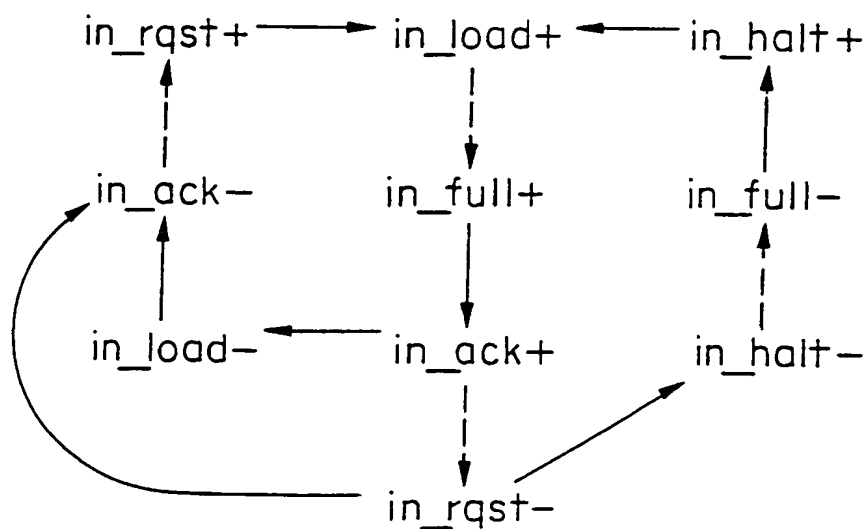


FIG. 15

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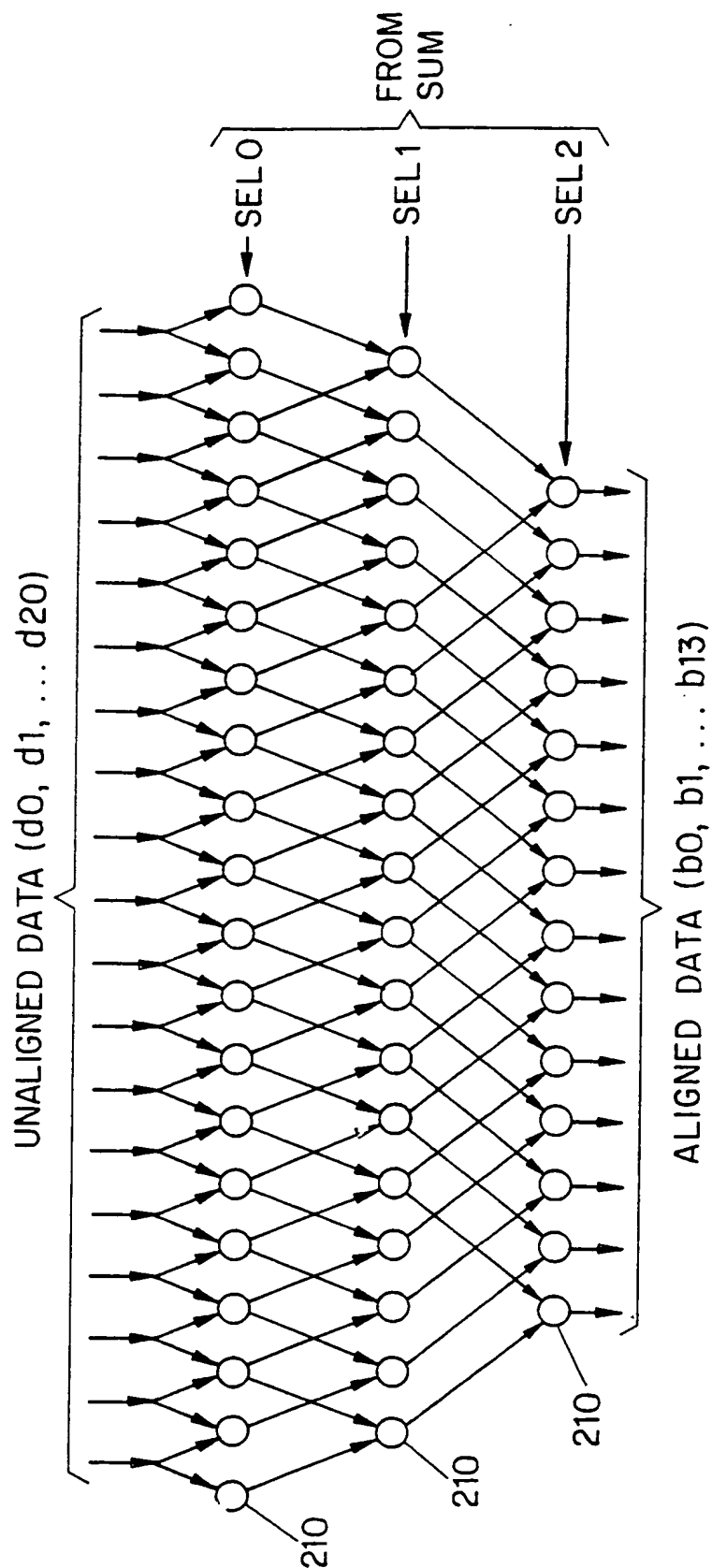


FIG. 16

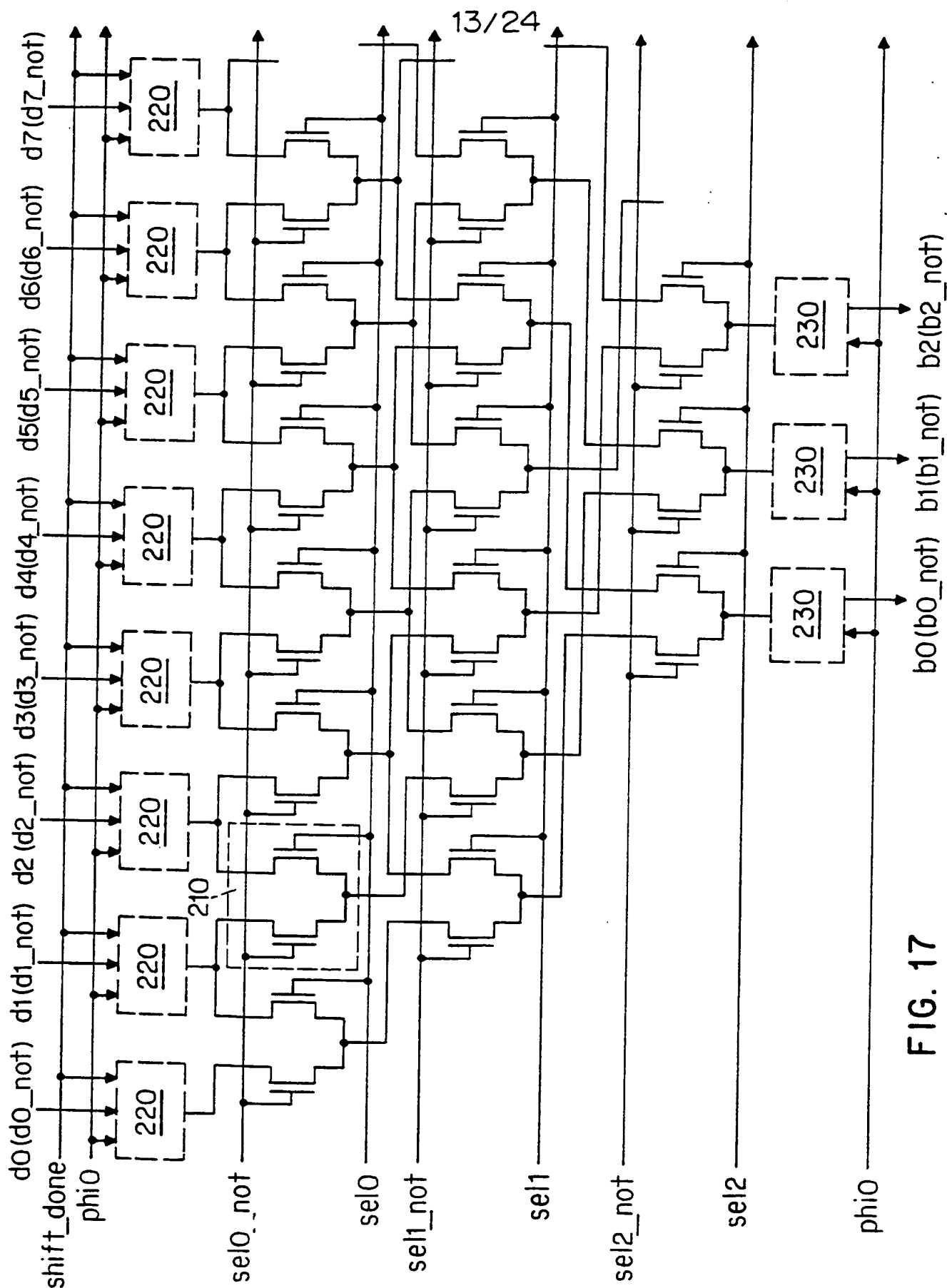


FIG. 17

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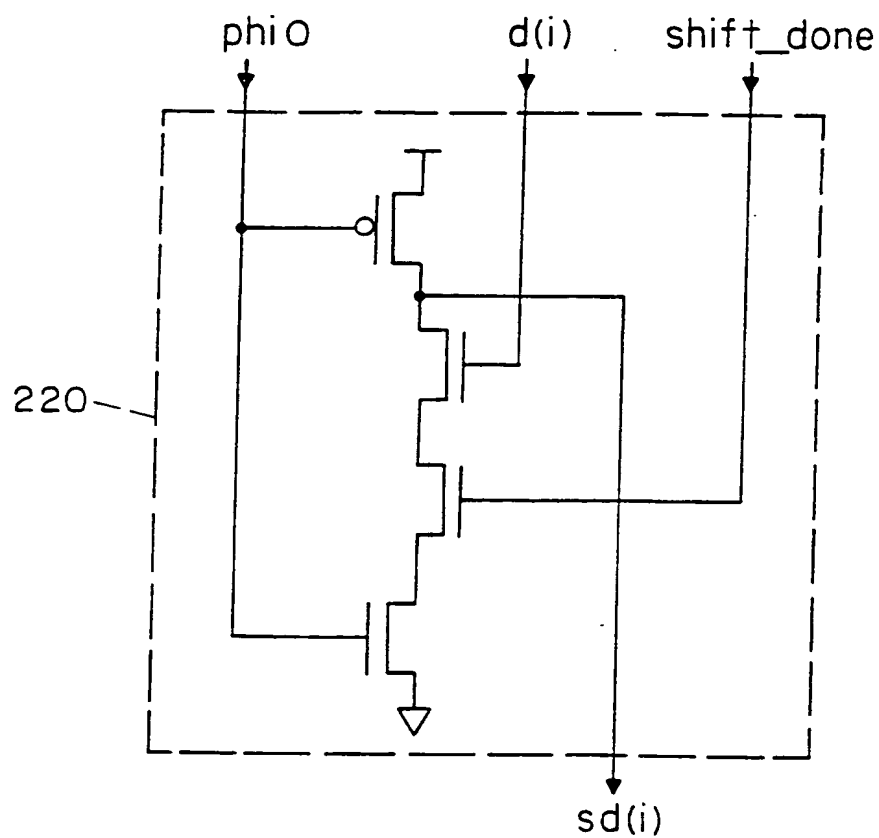


FIG. 18

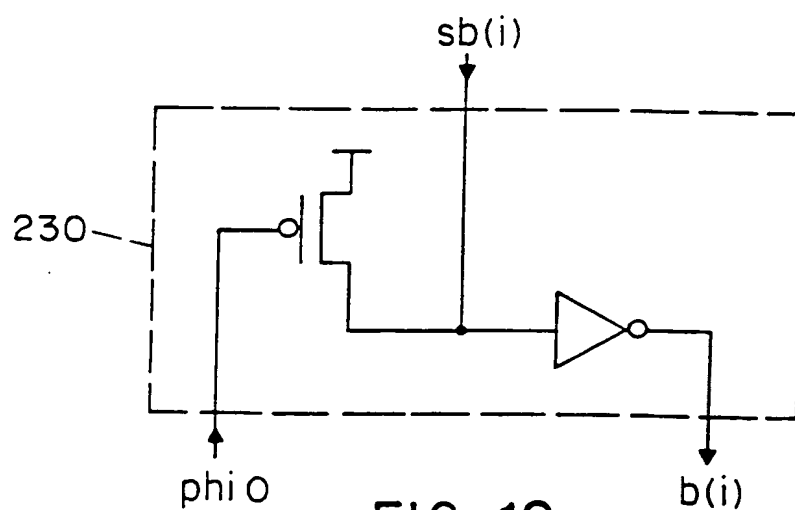


FIG. 19

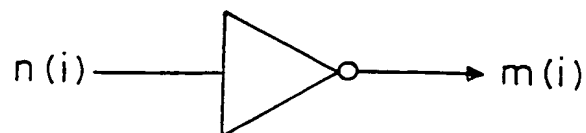
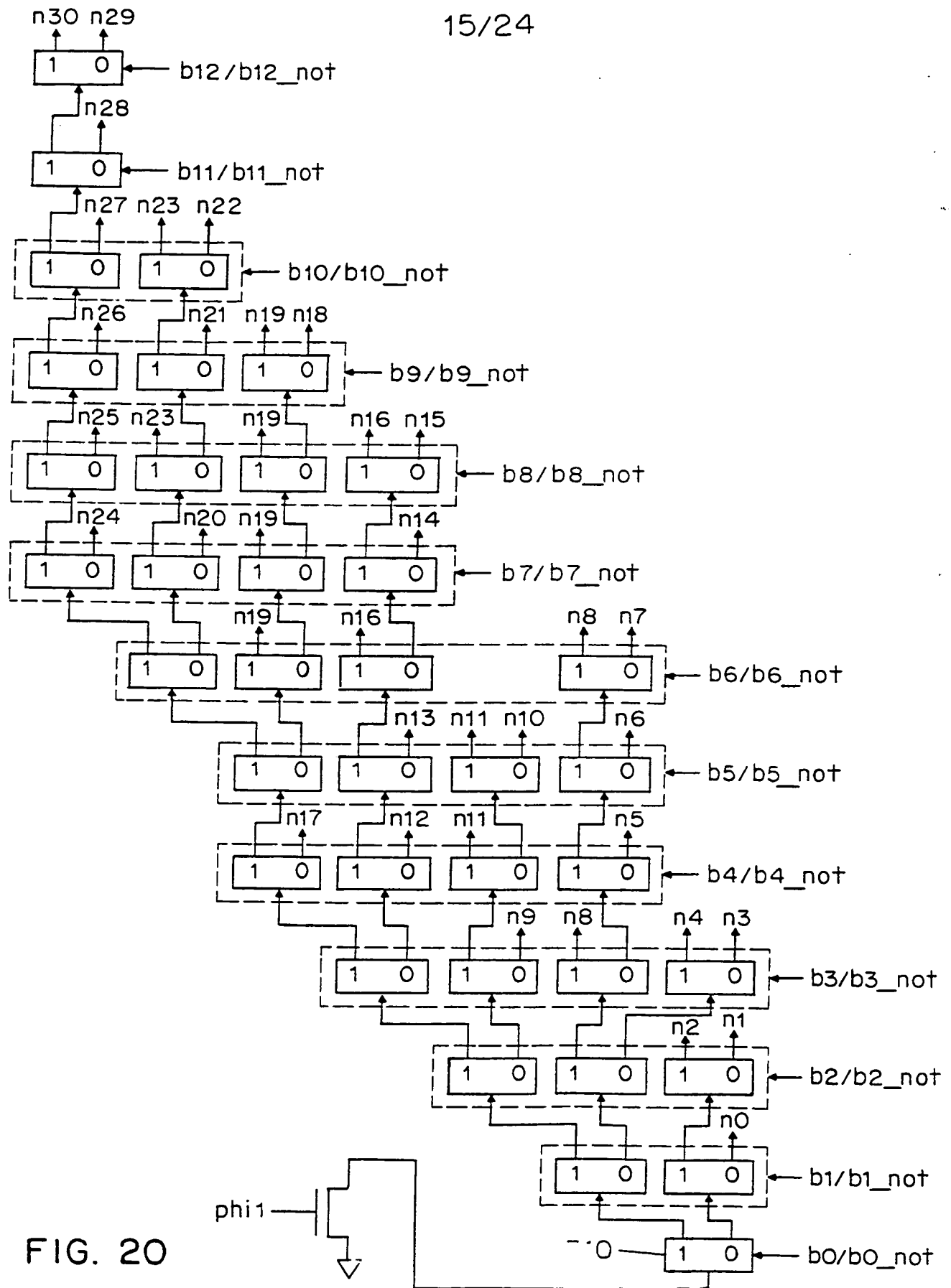


FIG. 21

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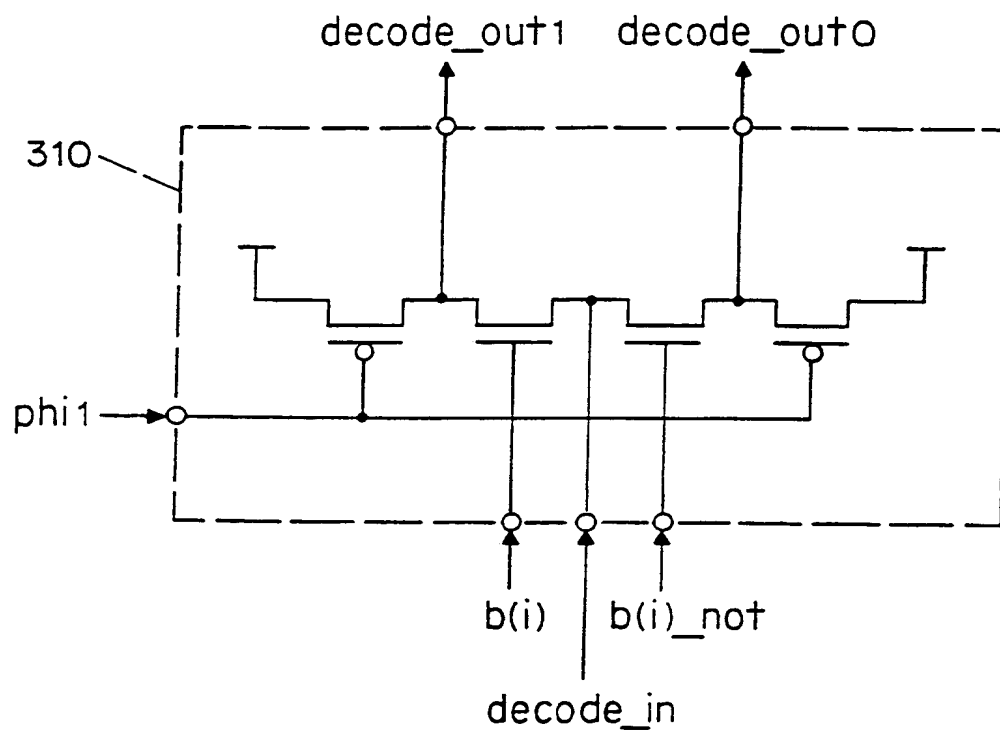
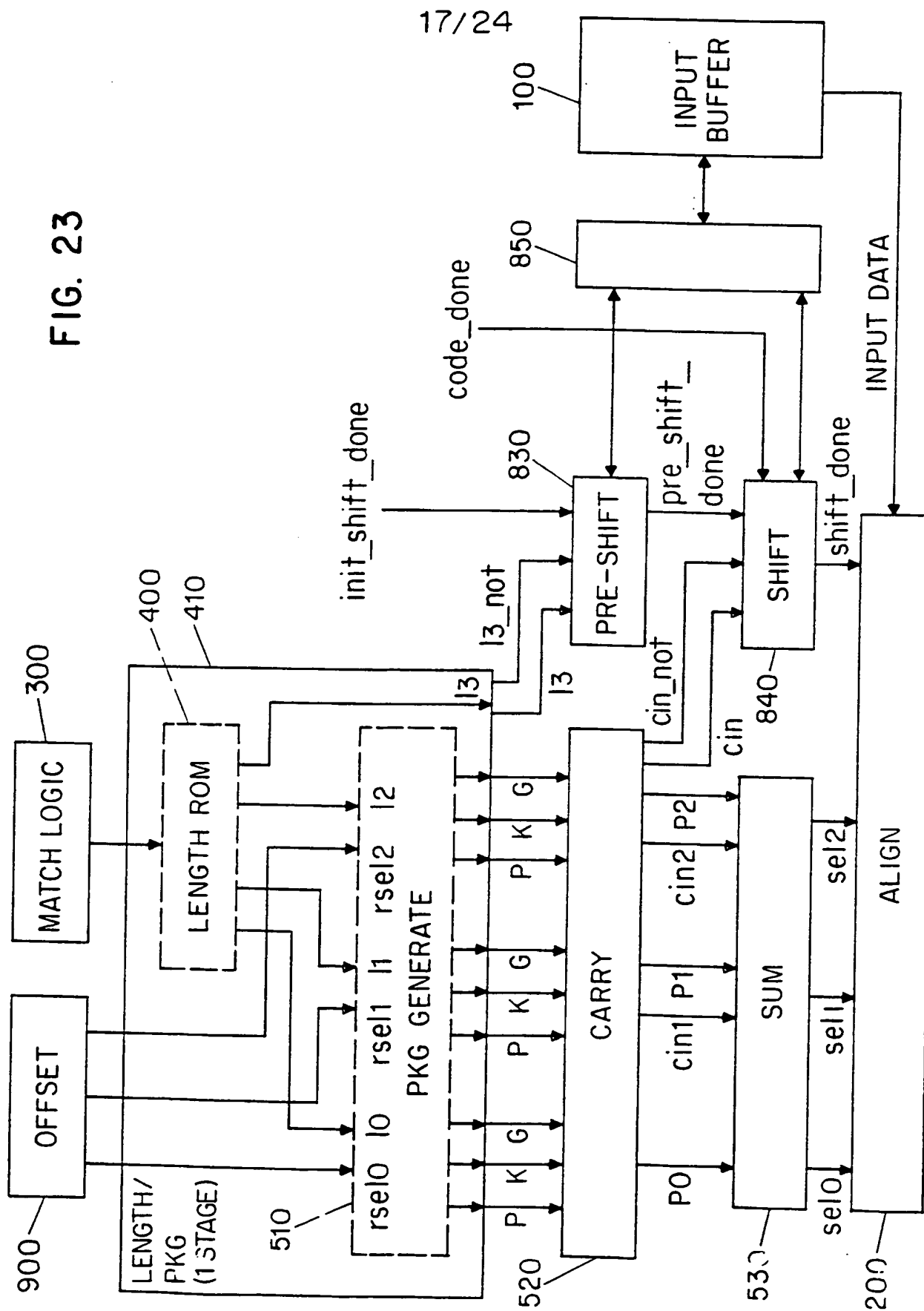


FIG. 22

FIG. 23



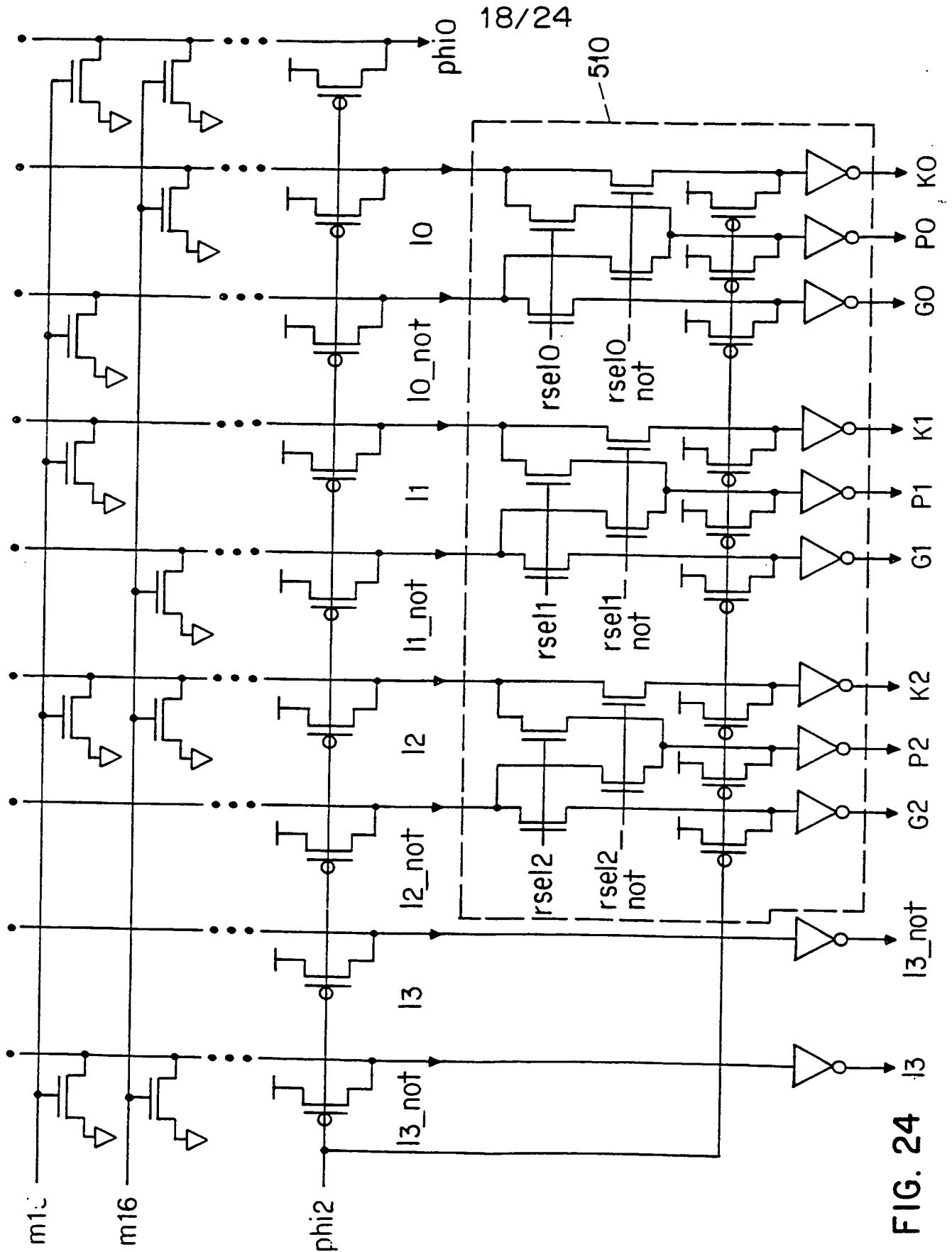


FIG. 24

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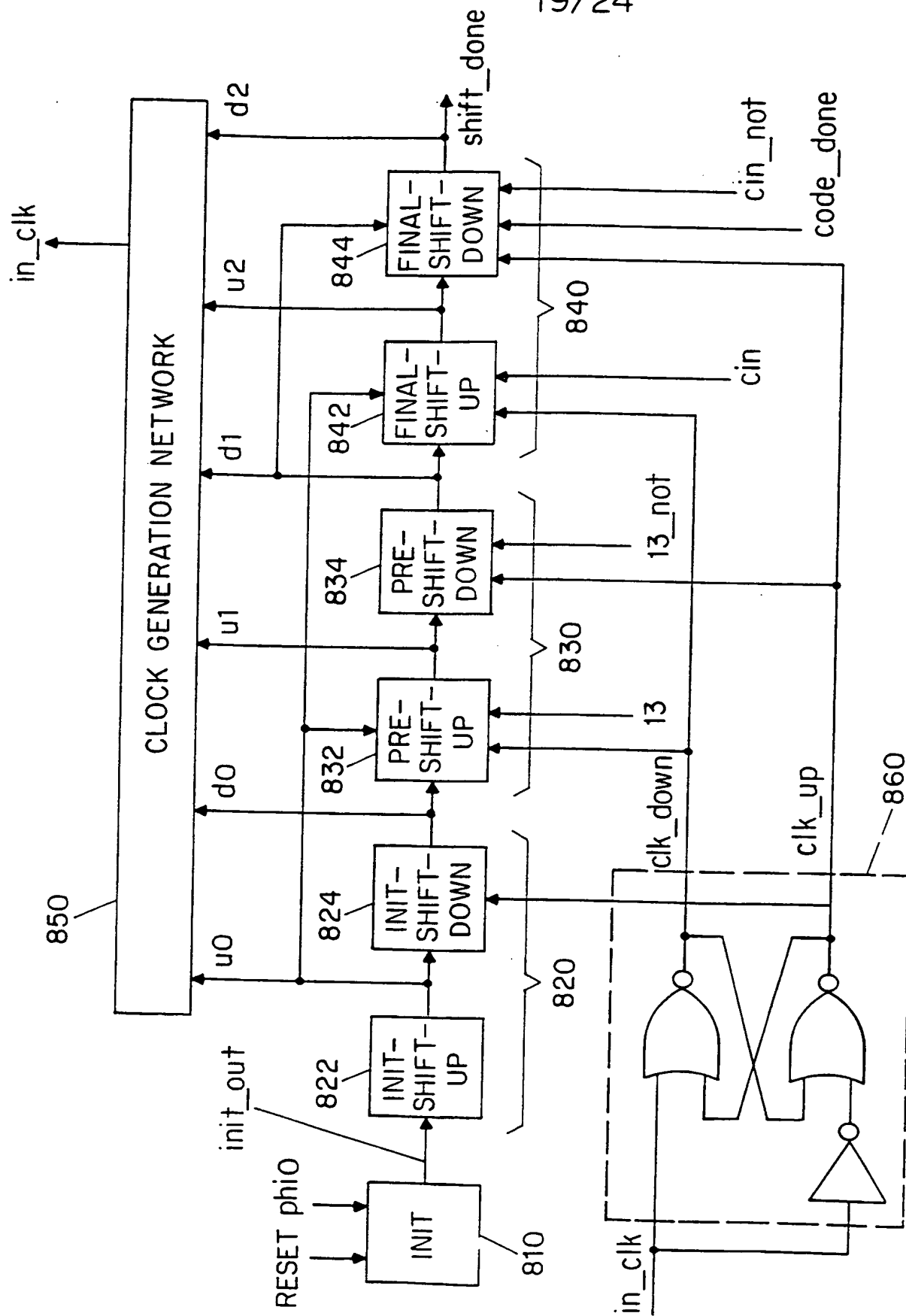


FIG. 25

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INPUT BITS (OUTPUT OF ALIGNMENT NETWORK)

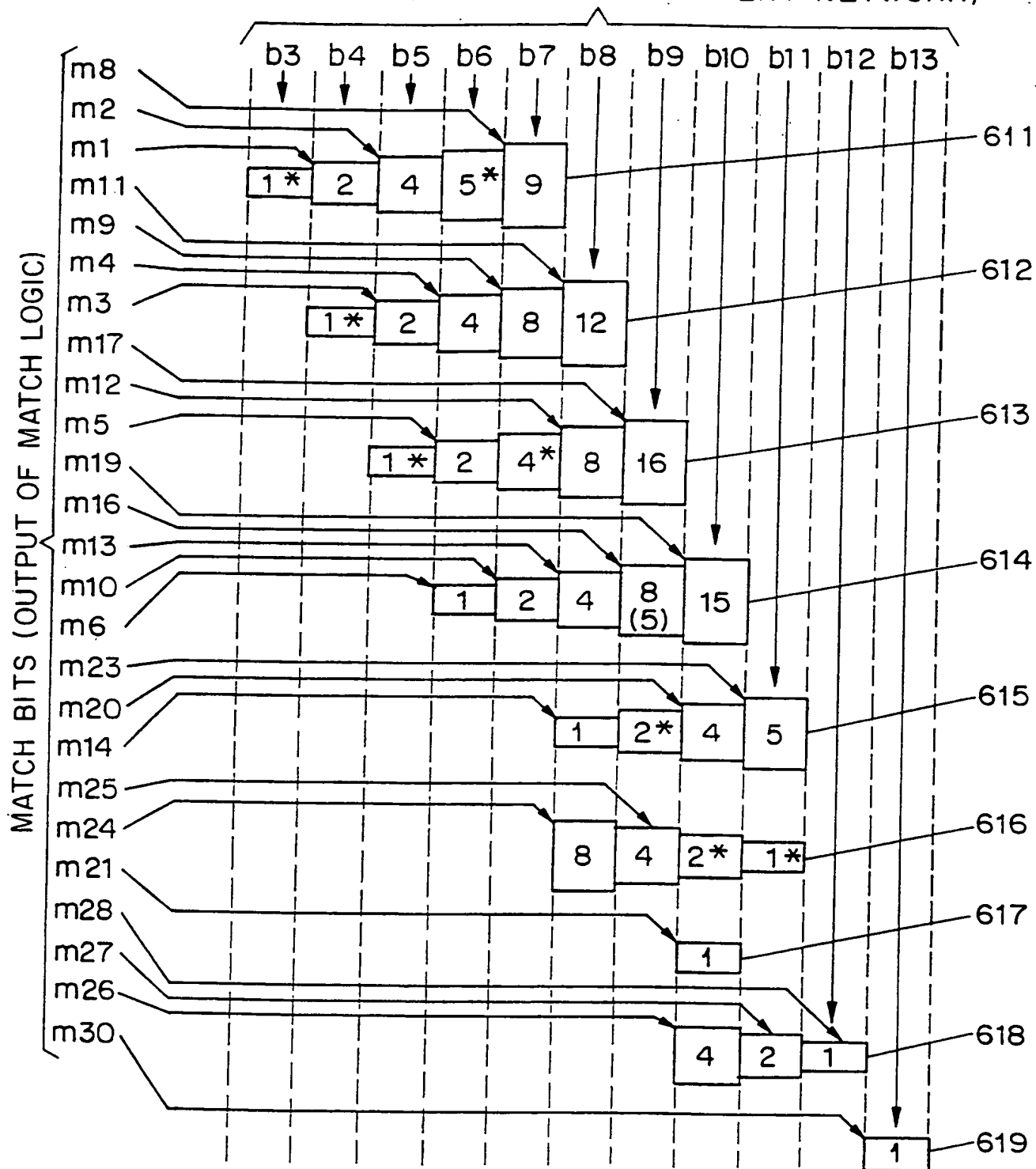
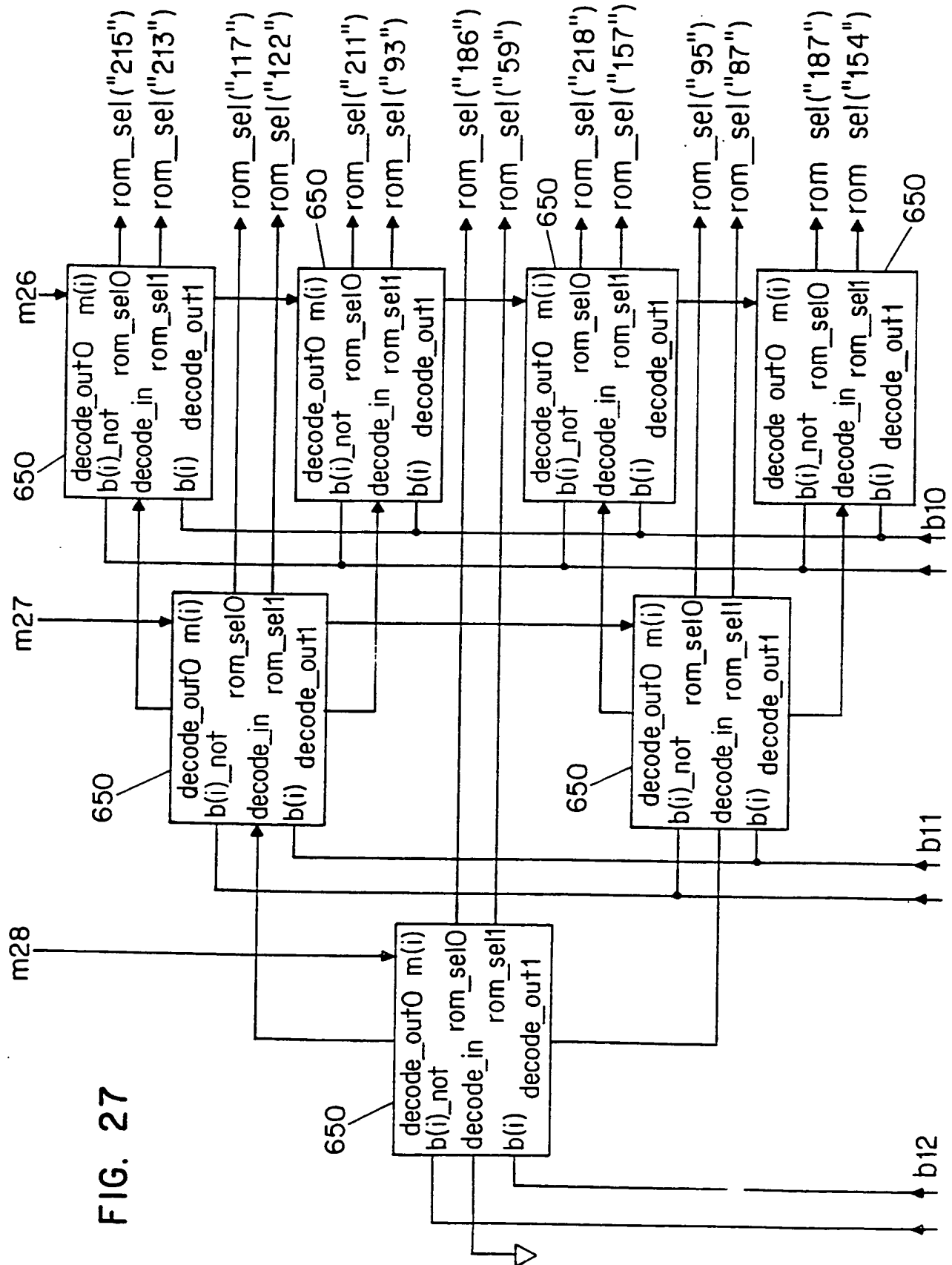


FIG. 26



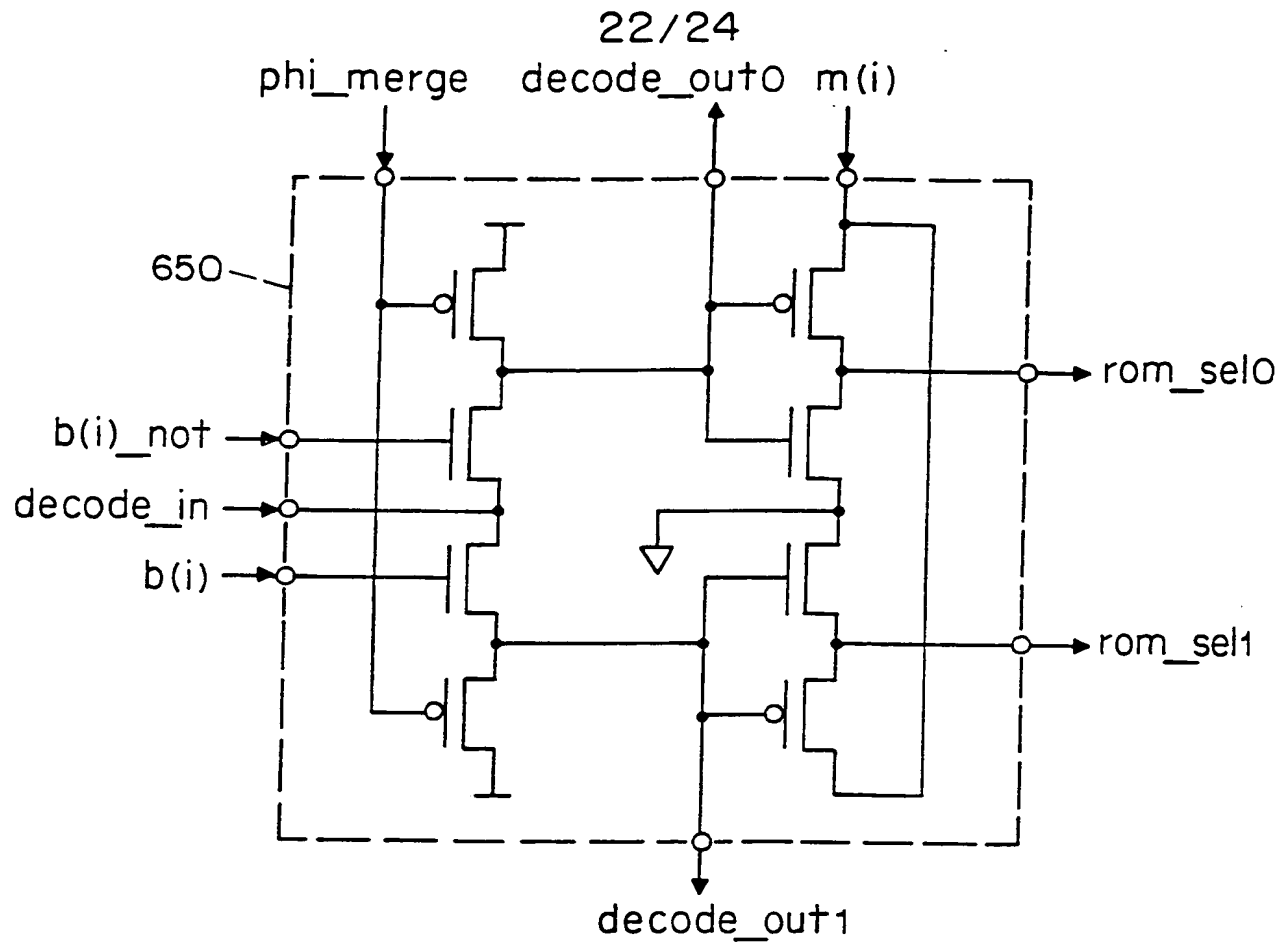


FIG. 28

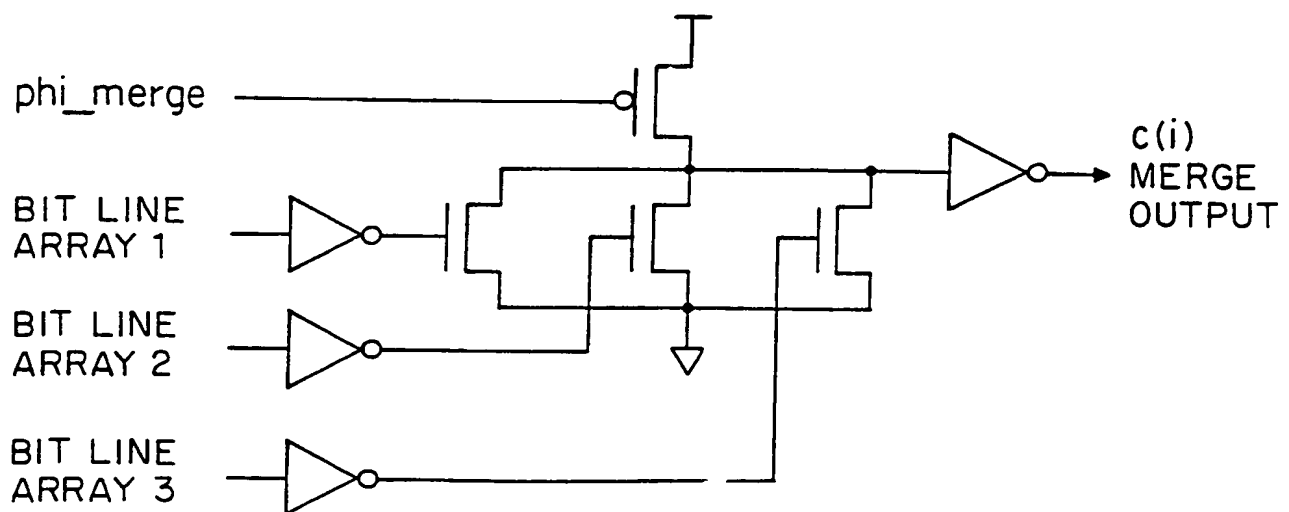


FIG. 29

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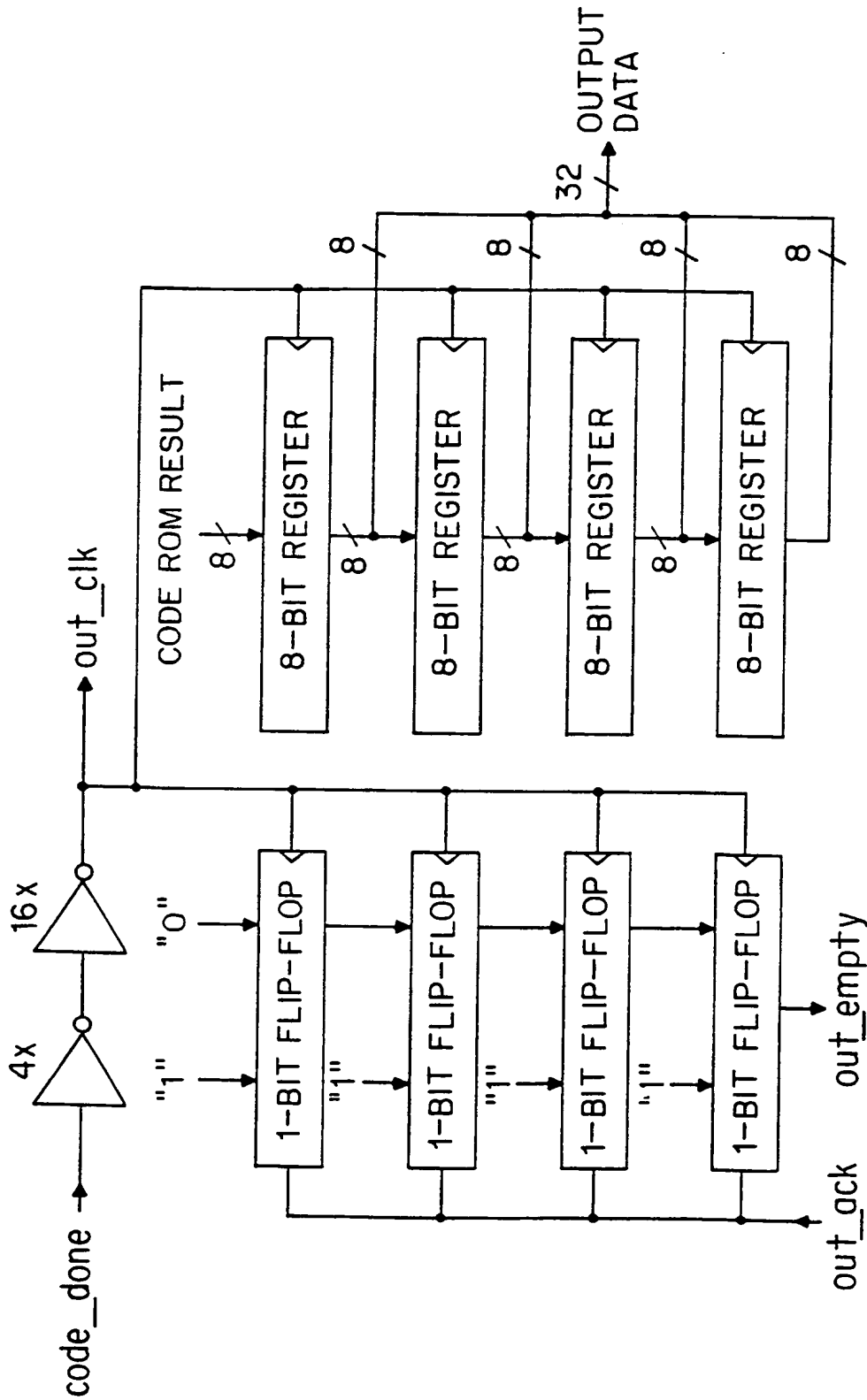


FIG. 30

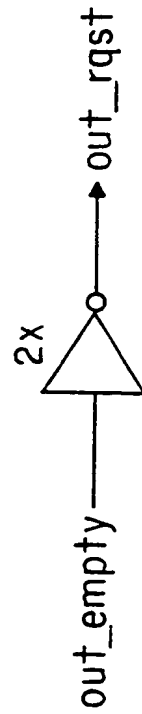


FIG. 31

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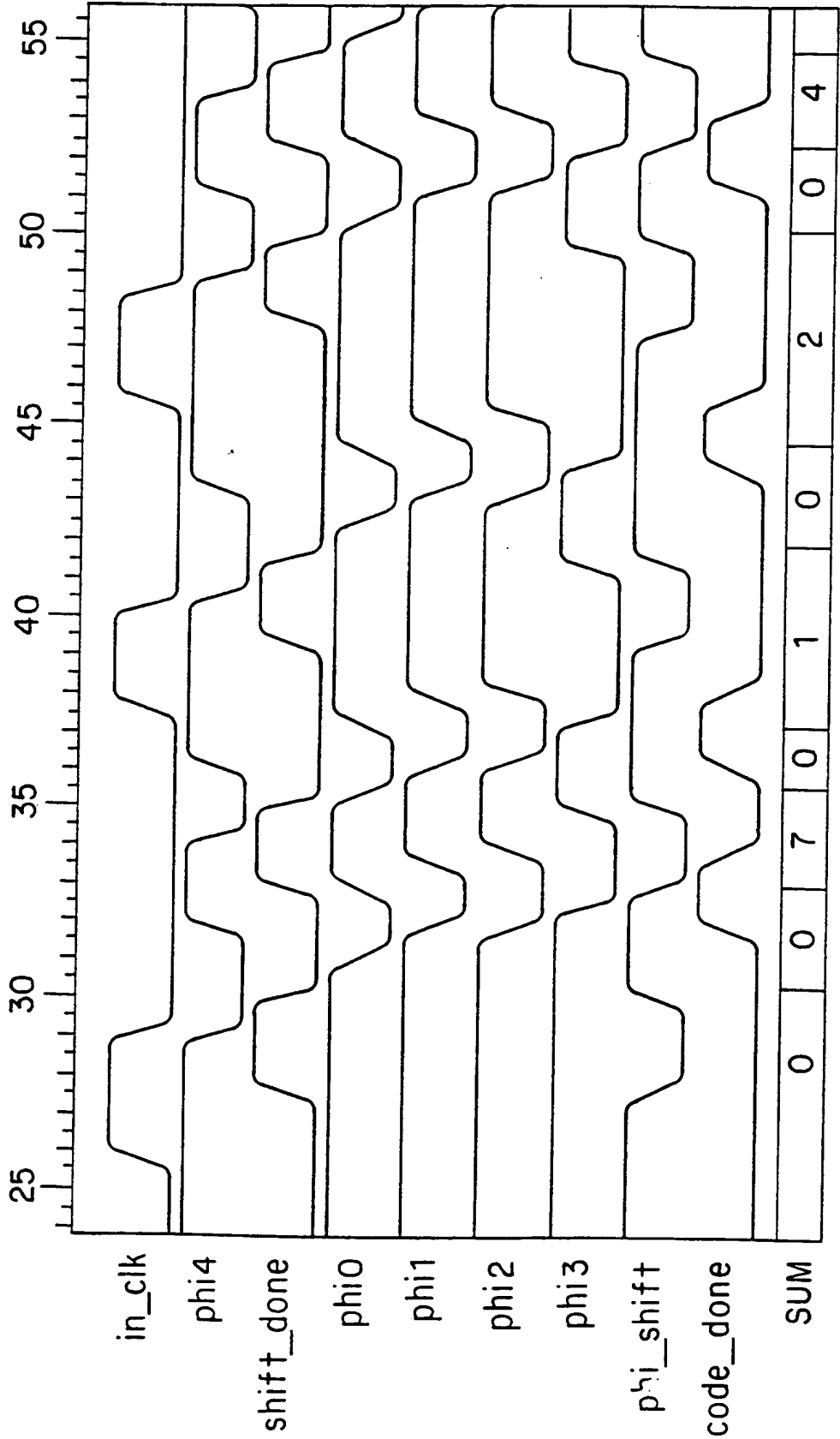


FIG. 32

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/20397

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H03M 7/40; G06F 7/00, 7/38

US CL : 341/65, 67; 364/715.02, 715.011, 749

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,671,151 A (WILLIAMS) 23 September 1997, col. 5, line 9 to col. 6, line 16; col. 8, lines 40-43.	1,2,11-14
Y	US 5,600,374 A (SHIKAKURA) 04 February 1997, col. 7, lines 10-13.	1-14
Y	US 5,625,355 A (TAKENO et al) 29 April 1997, col. 1, line 64 to col. 2, line 31.	1-14
Y	US 5,513,132 A (WILLIAMS) 30 April 1996, col. 3, lines 16-27.	3
Y	US 5,351,134 A (YAGUCHI et al) 27 September 1994, col. 11, lines 29-35.	2-12



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

14 JANUARY 1999

Date of mailing of the international search report

20 MAY 1999

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

William Grant

Telephone No. (703) 308-1108

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/20397

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,801,650 A (NAKAYAMA) 01 September 1998 , col. 2, lines 36-46; col. 7, lines 1-4.	6,7
Y	US 5,231,485 A (ISRAELSEN et al) 27 July 1993 , col. 10, lines 7-35.	10
Y	US 5,343,413 A (INOUE) 30 August 1994 , col. 3, lines 54-65.	4
Y	US 4,499,553 (DICKINSON et al) 12 February 1985, col. 61, lines 9-22, and col. 62, lines 5-12.	8-10

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US98/20397

B. FIELDS SEARCHED

Minimum documentation searched

Classification System: U.S.

APS - input buffer, self-timed ring, comput? thread, logic circuit, decoder circuit, variable-length, decompression, compresion, adder circuit, output buffer, alignment circuit, first and second logic circuit, asynchronous communication, asynchronous decoder, barrel shifter, alignment circuit, huffmann, tree, output.